MISSION excellence

CUTTING THROUGH THE NOISE

# PERFORMANCE, CULTURE AND RISK

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Executive Summary

This paper examines, from a practical perspective, the culture of safety which is prevalent in military fast-jet operations and argues that for reasonably predictable environments, it is possibly to employ a process-driven approach to risk management. However in reactive environments, where individuals are faced with ambiguity and imperfect information, or cumulative risk factors are correlated in ways which are not obvious, then the systematic mitigation of risk can only be effective as part of a wider risk or safety culture, where people are both equipped and empowered to make decisions in situations for which for there are no rules or processes. The approaches of other high-risk environments, in particular healthcare, asset management, energy and construction are critically compared against a cultural approach.

***Introduction***

Through Mission Excellence, I have had insight into a number of industries where risk management or safety are paramount e.g. healthcare, construction, energy and asset management, and had the opportunity to compare the various approaches to my previous experience in fast-jet aviation. In this paper it is assumed that the decision to operate in a high-risk environment has already been made or that it is implicit in the task. In that case, I propose that a purely systematic approach to risk management will only prevent an unplanned or adverse outcome in a limited number of scenarios. In particular making good decisions faced with ambiguity and imperfect information will require a holistic or cultural approach to risk. The conclusions herein were reached through experience, thought and observation; this is not an academic paper and the aim is not to produce an empirically justified recommendation, however I hope that the line of logic is no less intellectually rigorous for that.

First consider the predictability of risk. If I toss a coin and one side indicates a good outcome, and the other side an adverse event, then all things being equal, I can be confident that for each individual toss, there is a 50% chance of an adverse event, and over hundreds or thousands of coin tosses, the average number of adverse events will converge towards 50%. So the chance of a bad outcome is predictable, and I can capture the risk of an adverse event in a single number. This line of thinking could be applied to any manner of activities which have a discrete number of random outcomes – you can statistically predict them. And if I can model the risk like that, I should be able to manage it.

The same general line of thinking can be applied to more complex scenarios. If you are a manufacturer of high-tech aircraft engines and have lots of experience and data capture technology available to you, and if the engines are being operated at sufficient scale to smooth out statistical anomalies, then it is likely that you can predict average failure rates with some degree of accuracy. In fact with modern datalink technology it is possible that even when the symptoms of a problem do appear, they can be identified early enough to prevent the problem ever actually occurring; it is even possible for the manufacturer or airline to be aware of a potential engine problem on an aircraft in flight before the pilots. However to return to the key point, the combination of experience, technology, high reliability, and a statistical base of thousands or millions of operating cycles allows average failure rates to be predicted with reasonable confidence. You can capture the 'risk' in a model or number and it has meaning. By extension the risks can be managed or mitigated.

However when you're talking about actually operating an aircraft or airline, the number of risk factors increases exponentially, and so it is necessary to take a more comprehensive approach. In fact, when one thinks about the reality of what happens, it really is incredible that commercial flying is so statistically safe. 300 people get inside a metal tube supported by 2 metal wings which actually bend, weighing 100,000 kg and containing thousands of miles of electrical wiring and thousands of tonnes of fuel. The tube flies 7 miles above the earth for maybe 5,000 miles, at 500 miles an hour, getting blown off course by variable 100mph winds, deliberately separated from hundreds of other metal tubes by only 500m, before landing on the other side of the world in fog with pinpoint precision on a piece of concrete 50m wide, having used 95% of its fuel. Now I don't wish to worry nervous fliers, but the fact that you can do this is incredible; the fact that it hardly ever goes wrong seems nothing short of a miracle. The combination of minimal risks of equipment failure together with high quality training, rigorous and systematic application of regulation, standard operating procedures and checklists etc, allows many of the variables to be isolated and the risks modelled, mitigated and managed. What the airline industry has done very cleverly here is to 'systemise' the vast majority of the risk out of the operation.

Despite the inherent complexity of the challenge, operating a commercial aircraft safely from A to B can largely be achieved through a ***predictive*** approach though. Airline staff might see this differently, but in terms of safe operations, the task is fairly discrete, well defined and repetitive, the execution is unlikely to vary too much from the plan and most of the variations which might cause problems can be identified and modelled in advance. However if I am doing open-heart surgery, flying a fighter jet, drilling for oil, or investing in stock markets, you start with a plan, but the only certainty you have is that it will never work out as planned. The execution of the task is highly ***reactive*** to things which happen along the way. And given the number of risk factors, many of which may not have been identified at the outset, few of which are discrete, and almost all of which might be correlated in ways which are not immediately obvious, it is clearly impossible to model all the risks or to 'systemise the risk out'. It is still vital and important to put the necessary risk systems and processes in place, but they will be insufficient as soon as a situation is encountered for which there is no rule. This is slightly disappointing because in extreme adverse events, that is the time when you really want people to get it right, and it is the time when limits of a purely mechanistic approach are likely to be most exposed. It is unlikely that anybody in the control room had a nice tidy process to hand when BP's Macondo oil rig blew up in the Gulf of Mexico.

So in fluid reactive environments, which are subject to complex unpredictable cumulative risks which are near impossible to model or mitigate with any process-driven or linear technique, how does one approach the issue of risk management? The approach in fast-jet aviation is to take a holistic perspective and to employ safety processes and models as just one part of ***a culture of safety***. The idea is that we can't possibly build a process for every scenario (although we make a good attempt at the more obvious scenarios), so rather than attempting to give people a full set of solutions, we provide a set of rules, guiding principles and default procedures, together with both functional and behavioural training, and empower people to make decisions to deal with the unique situations they end up facing. As part of that same culture, we place a heavy emphasis on those leadership values and behaviours (e.g. courage, integrity, objectivity) which support open honest evidence-based decision-making independent of hierarchy, with ***safety as the single over-riding priority***. It's the difference between giving a man a fish and teaching him how to fish. In this case, it's not possible to provide all the solutions, so the aim is to equip fighter pilots with the ability to reach safe solutions themselves. As fighter pilots, safety or risk management is not simply a compliance exercise, or something which is outsourced to a separate department; it's owned by the operators. Safety is what we do. If it can't be done safely, or at least within agreed acceptable boundaries of risk, then it can't be done at all.

The remainder of this paper proposes some constituents of a safety culture and then describes our observations of risk management in healthcare, asset management, oil, gas and construction. A culture is assumed to be some sort of difficult to define mix of all sorts of factors which influence 'what it's like around here' and 'how we do business around here'. Here I split out the constituent parts of a safety or risk management culture into 5 factors:

first the ***systematic mitigation of risk*** through a foundation of

- Organisational, and
- Procedural issues,

followed by the building of a wider ***safety culture*** by addressing

- Behavioural issues
- Execution, and
- Leadership

***Organisational Issues***

Organisational issues in this context refers to the way in which basic good practice is embedded through regulation, supervision, training and assessment.

No matter the heavy emphasis on empowerment and individual responsibility in this paper, there is still a clear requirement to mitigate the most obvious risk factors through rules and regulations e.g. low flying rules, minimum separation distances etc. These are limits for which there is almost never any rational argument to operate beyond them without an unacceptable reduction in safety margins. Regulation might be seen as the minimum requirement for safe operations set by an external supervisory body; compliance is mandatory.

In addition to individual compliance with regulation, mutual and cross-supervision is an accepted part of operating fast-jet aircraft. Whilst authorising and supervisory powers are delegated to suitably able and experienced individuals, it is common for the designated supervisor to not necessarily be the most senior 'line manager', and they would be wholly within their powers and responsibilities to challenge 'up the command chain.' Indeed all aircrew, no matter how junior, are encouraged to challenge any practice which they regard as unsafe or carrying undue risk.

Safety (or risk) related training is another consistent theme throughout a pilot's career. The most regular example of this is in the frequency of simulation training. This might vary from mission simulation, which is about exercising decision-making rather than aircraft-specific skills, to emergency procedure training which exercises and improves knowledge of operating systems and procedures. The power of this training is the ability to simulate high-risk scenarios in low-risk environments; crews are permitted to learn from mistakes without operational consequences.

Both implicit and explicit within the training mandate is an element of assessment. What is unusual about this compared to some other environments is that the assessment is agnostic with respect to rank. To provide some context, a squadron commander, who is the senior line manager, will each year be required to undergo a review of core flying skill, and separately, of instrument flying ability. And these tests will normally be carried out by a subordinate (who is a specialist in training and assessment) on the commander's own squadron. Every two years, both her and her squadron's tactical ability will be assessed by a separate specialist assessment unit. This concept of routine internal audit, including by junior members of one's own unit may seem alien to many, especially when compared to, for example, consultant doctors who until recently were subject to intensive assessment during training until around age 35, and then no further formal assessment for the rest of their career. However, how arrogant would it be for a squadron commander to fly around in a £35M aircraft close to human and technical performance limits, with the potential for a mistake to cause untold damage and loss of life, and yet to assume that they were above ever having their core competency re-validated by virtue of seniority?

Now one might assume that this combination of rules, training, supervision and cross-checking stinks of micro-management and over-regulation, however the reality is somewhat different. The aim of routine ongoing assessment is not to catch people out, but simply a chance to check that no bad habits have crept in and give people a few pointers (as well of course as a chance to apply some more proactive performance management for those with significant weaknesses or unsafe habits). And because professional standards, ability and safety are such an integral part of the whole operation, rather than feeling checked up on, many pilots will regard training rides and assessments as a chance to

demonstrate their prowess. There is a chance to build confidence and positively impact on career prospects.

A strong organisational approach to compliance with regulation, internal challenge to poor practice or non-compliance, training and assessment is the first building block in a systematic approach to risk management. The rules set the boundaries within which the subjective decision-making takes place.

***Procedural Issues***

Procedural issues in flying operations most often refer to standard operating procedures (SOPs). This is the systematic application of best practice and a consistent modus operandi which defines the default way of operating in the absence of any specific brief to the contrary.

There is widespread use of SOPs within the military, however this does not make for an inflexible rule-bound organisation. In fact, it's quite the opposite; extensive use of SOPs means that operators do not 're-invent the wheel' for every mission. All the basic procedures for operations and co-ordination of different units are standardised which releases a lot of spare mental capacity for dealing with any unique aspects of the task. This has advantages over and above the blindingly obvious:

- It introduces predictability into operations. Predictability massively reduces the training burden and gives enormous flexibility. It is possible to chop and change elements or individuals within the team without any impact on performance or increased risk; everybody is already 'working from the same sheet'. Note that SOPs are not rules. If a situation requires divergence from SOPs, that is fine as long as it is planned and briefed in advance, and everybody is aware of the non-standard elements. However in the absence of any brief to the contrary, the default procedure is pre-defined.

- It systemises best practice. SOPs are not a haphazard collection of procedures; they are the assimilation of hard-won corporate learning over many years, which continue to evolve over time.

SOPs are less rigid than rules; they will not be perfect for every situation, but they should define a robust, effective and safe default mode of operations for a majority of situations.

***Behavioural Issues***

Behavioural attributes form a set of core competencies which are critically assessed in military selection, training, and promotion boards. There is a heavy emphasis on leadership, teamwork and followership at all levels. In military aviation, there is additional emphasis on crew co-operation, or the related (and badly-named!) concept in commercial aviation of Crew Resource Management (CRM). The development of CRM over the last 30 years is a reflection of the growing importance attached to human communication and decision-making in resolving safety-critical issues. Quite often it's not the technical failure which brings the jet down, but how the crew deals with it. The factors driving effective CRM can be summarised as:

- Communication – engaging in a participative leadership style and exhibiting behaviours which encourage an open honest dialogue and challenge; experience in the commercial airlines

shows that the most effective crews spend approximately 30% of their time communicating even in high-stress intensive scenarios

- Choosing behaviour – this is about choosing a behaviour appropriate to the situation or role. A simple example would be that if you are the leader, to step up and accept the decision-making responsibility which goes with the role, however if you are not the leader, behave like a team player in support of the leader whilst letting the leader lead

- Feedback – giving and receiving feedback is the subject of a wealth of literature and training and the concept and key issues are no different in this context; they are closely related to communication issues

- Situational awareness – refers to the ability of an individual to build and update a mental model for the world in which they are operating; it implies an ability to understand the practical impact of their decisions on other external players and v.v.

- Medical factors – human performance is highly susceptible to variations in physical and mental fitness and wellbeing. Again there is a vast amount of literature in the various professional fields, however it is hopefully self-evident for example that alcohol and fatigue impair performance. More subtly, in high-risk environments, it is important to recognise that factors such as bereavement and divorce are significant inducers of personal stress in yourself and colleagues, and have the potential to impair decision-making

- Decision-making – decision-making is of course 'what it says on the tin'. Whilst good communication practice tends to imply a participative leadership style, decisions still need to made and acted upon. Sometimes any decision is better than no decision. However remember that changing a decision does not necessarily mean indecision

CRM training is now formally mandated for commercial airlines and is widespread within most of military aviation. Its importance is clear recognition that no matter how much technology and automation improves, for the foreseeable future the necessary but weak link is likely to remain the 'man in the loop'. The latter brings enormous cognitive ability and perhaps more importantly can apply judgement, intuition and experience to subjective and/or ambiguous situations. However he or she also brings finite processing capacity, ego, personality, group think etc. More than anything CRM is about developing some self-awareness of these weaknesses and improving awareness of the impact of one's own behaviour and in particular the implications of that for performance and safety.

Behavioural issues are almost by definition subjective; changing behaviour is a long-term commitment, and compliance and ability are not easily empirically measured. However extensive research in commercial aviation has clearly demonstrated a tangible improvement in performance and risk management through behavioural training.

***Execution***

In military aviation, and to a lesser extent in commercial aviation, we employ a clearly defined activity cycle which can be summed as plan-brief-execute-debrief. There are many variations e.g. plan-implement-review, and whilst the concept might be regarded as a procedural approach, I would suggest that the heavy emphasis placed on the 'discretionary' parts of the cycle: plan, brief, debrief (you have

to execute!) are indicative of a more deeply rooted culture of excellence in execution. The cycle has a myriad of positive features in bringing clarity, maximum brainpower, task organisation and rigour to our activities. However in this paper, I just want to highlight those aspects which support the culture of safety and the management of risk.

Whilst most planning will improve performance to some extent, the critical element here is the approach to contingency planning. The armed forces in general could be summed up as a plan B organisation, and nowhere is that more true than in fast-jet operations, where a significant part of the planning and briefing effort will be spent on 'what if', on scenario modelling as many as possible of the more obvious things which might go wrong. The ability to correctly focus contingency planning effort will depend heavily on previous experience. However we try to look forwards rather than backwards. The most relevant question is not 'what happened previously', but along the lines of 'given the specific situation we are now facing, what would cause us the most problems, or is most likely to go wrong today?' Of course it never goes wrong quite like you planned it. However what happens over time with this 'culture of contingency planning' is that you build a mental database of contingency options; the decision we made in the crewroom with our feet on the table having a coffee with a few minutes to calmly discuss the issue, is always going to be way better than the decision we make under enormous personal stress in the heat of the moment when the pressure is on. What we are trying to do is make the high pressure decisions in low pressure environments – a simple extension of the logic behind simulation.

The value-add of briefing with respect to risk is simply that we have task and role clarity. Everybody knows what their own task is, has an overview of other people's tasks and an understanding of how they all contribute to the bigger picture. The value of having everybody 'sing from the same sheet' and the benefits of that to risk management should be self-evident.

Planning and briefing empower and facilitate execution excellence. Debriefing, on the other hand, allows us to learn from the execution experience, and to carry that learning forward to the next planning process, and for major learning items to our SOPs. At Mission Excellence, we have communicated extensively on the debrief process in our training workshops and in other papers; the key point for this paper is that we are proactive about learning. We don't simply improve by osmosis or because we got a year older; we actually do something to identify the learning, and then apply it with accountability such that there is a performance change. And every single debrief starts with 'safety'. Safety is the most important issue for us. Performance is largely irrelevant if you're routinely having major accidents; in order to make money from investment, first you have to not lose it. By discussing risk or safety issues first, it emphasises very clearly for all attendees, the premium which is placed on safety. It also has the benefit that if there has been a major safety issue, people may have strong emotional or subjective opinions; it is better to apply some objectivity and analysis to that issue first, and 'put it to bed' rather than leave it bubbling away beneath the surface.

The cumulative effect of the cultural approach becomes clear when considering the challenge of making judgement calls. In his book 'Blink', Malcolm Gladwell contrasts the relative benefit of extensive rational analysis compared to the intuitive opinion of an expert, and asks how it is that an expert can reach an opinion on a judgement call in a fraction of the time required for the associated analysis. At the risk of completely failing to do justice to Gladwell's work (which was a bestseller!), he offered the argument that an expert has an intuitive mental model formed subconsciously from years and years of experience, which can be instantly compared with the issue or problem at hand. For me, this line of logic only tells half or less of the story.

People's opinion of the traits of a good pilot would tend to focus on eyesight, hand-eye co-ordination, spatial awareness etc. When learning to fly, this is all true, and you won't become a professional pilot without those things. However for a military fast-jet pilot, the ability to fly the plane has to be 'taken as read'. The point of difference for an exceptional fighter pilot is rarely the ability to take-off and land, or to fly from A to B. Operating a fighter jet is more than anything an exercise in information management or multi-tasking. Often the pilot is faced with multiple sources of data and information (2 or 3 radios, radar, infra-red sensor and datalink, in addition to all the flight and engine instruments). External sensors will have different degrees of confidence associated with the sources which are contributing to the synthetic picture displayed. A full analysis for any one complex decision might theoretically take an hour or more, but actually a decision (judgement call) is required in seconds. There are three important lessons to highlight:

1. Whilst modern fighters and fighter pilots rely on an ever increasing degree of automation, key operational decisions are rarely automated. Sensor fusion and data fusion are critical to present the pilot with something comprehensible from the vast amount of input data. However technology is used to support and inform decision-making, not to make decisions. There are simply too many variables to model them all – not least in that role, you are to some extent reactive to 'what the bad guys do'; you have to interpret the information within a wider context.

2. We always try to operate with a margin of safety. This is a difficult thing to quantify and is best summed up in several well-worn clichés: 'An exceptional pilot never gets into a situation which requires exceptional ability to get out of.' 'If there's any doubt, there's no doubt.' 'Trust the hairs on the back of your neck.'

3. Given the potential catastrophic outcomes of a wrong call, it would be less than ideal to rely on Gladwell's mental model built solely by osmosis; this is an unconscious approach. Fighter pilots have the benefit of an additional more conscious approach to building that model. Firstly as well as learning passively by experience, they learn actively through debriefing. They routinely identify the root causes of what went well and badly, which then informs individual and collective learning for next time. And also the most likely difficult scenarios which they might encounter are modelled in advance through the planning and contingency planning processes. So when a fighter pilot is facing a situation where a constant stream of decisions is required in a high-risk environment, characterised by ambiguity and an overload of imperfect information (sound familiar to anybody?), he has the advantages of:

- A set of rules to keep him out of the most obvious dangers
- Mutual support and cross-supervision from other experienced team members, operating in a near flat hierarchy
- Honing of his core functional skills set through regular, training, assessment and feedback
- Corporate collective experience of many years captured in SOPs, defining some default options
- Behavioural training to increase awareness of his communication style and the impact of that on decision-making and team performance
- Scenario models covered in the simulator or in mission-specific contingency planning
- Proactive learning from all his previous debriefs, both the ones he led, and the ones where he had the benefit of other people's learning, including senior leaders
- A deeply ingrained approach, both organisationally and individually, to a margin of safety

The combination of organisational, procedural, and behavioural issues together with the approach to execution helps to empower decision-making without undue exposure to further unnecessary risk.

***Leadership***

The difference between success and failure often rests on the strength of a single quality: leadership
**Winston Churchill**

There are many elements to a campaign. Leadership is number one. Everything else is number two
**Bertolt Brecht**

In one sense everything I have written is ultimately about leadership. Only the senior leaders will initiate the rules, processes, procedures and training to make any of the above happen. However defining a set of processes will no more influence activity than writing values like 'teamwork' and 'trust' on a mission statement in reception and expecting them to influence organisational behaviour. Whether consciously or unconsciously, people respond to what gets measured, rewarded and recognised. If you talk a good story on 'team' and 'values', but pay individual bonuses based on performance, what sort of team behaviour do you expect? If you sell the importance of risk management, but reward only return, what will be the organisation's attitude be to risk? The CEO of a newspaper may have been unaware of the specifics of phone-hacking, however when an organisation's culture is to get the big story, no matter what it takes, the leader cannot subsequently deny accountability for what happens within that culture.

Imposing a set of safety rules is easy. Building a culture of safety is hard. Like any change or cultural initiative, it requires overt executive sponsorship, 'over-communication', deployment of champions and most importantly, training and rewarding the right behaviours. And overt executive sponsorship is not about talking; it is about walking the talk. The courage and integrity to deal with difficult issues and accept responsibility for failures need to be combined with the objectivity to make true evidence-based decisions. We have seen numerous organisations where the senior leadership team (SLT) is genuinely united on an issue e.g. that there is a no-blame culture, however when you ask line managers about the barriers to open honest communication within the organisation, they instantly refer to the blaming behaviours of senior management (by the way, it is no good the SLT claiming that the workers have got it all wrong; perception is fact here). Nobody will put their head above the parapet if they think that there is a pretty good chance of the messenger being shot. More than anything, what we are talking about here is the symbolic effect of your leadership. People form an opinion of you as a person and a leader, not by what you say or what you communicate, but by what you do, not the values you claim to hold, but the way that your values are exposed through the behaviours which you exhibit.

The Royal Air Force has not been without its challenges on this front. Some years ago, there was a perception building on the front-line that in the absence of definitive evidence to the contrary, there was a tendency to blame aircrew error for accidents. This becomes most contentious in the case of a fatality, where both decency and process dictated that blame should not be apportioned to the deceased unless no doubt existed [my phrasing]. Of course, once you lose the confidence of the line managers and operators, it is a big challenge to get it back, and a healthier culture was only restored after some very public commitments and long-term effort by a new head of the organisation.

However with the right leadership behaviours at the top, you start to create an organisation where leadership can exist at every level. Empowerment, devolved decision-making and responsibility can only exist in an environment of mutual support and trust, where individuals have confidence that if, when faced with imperfect information, they make a reasonable decision for the right reason, they will be supported in the case of a genuine error of judgement, or if their decision is undone by operating

hazards. If you're doing something which is implicitly difficult and dangerous, it does carry risks and it won't always work out perfectly. If you have done everything you can to protect your margin of safety, and act with the highest professional standards, then no-one can ask more than that. Sometimes it just goes wrong. Rather than blaming people, we try to use this as a learning opportunity for everybody.

In addition to the leadership attributes already mentioned, one should never underestimate the value and importance of common sense in making risk decisions. It's kind of an extreme form of objectivity, trying to drill to the heart of an issue by cutting through the noise to really zero in on the underlying logic, often by asking the most basic 'dumb-ass' questions. Elliot Cohen in his book, 'Supreme Command', forms an extremely positive impression (contrary to some commentators) of Churchill's ability to exercise high-level command, by asking the simplest and yet most probing and penetrating questions of his military leaders. Cohen refers to this as 'massive common sense.' In a world of complexity and information overload, never underestimate the value of massive common sense to benchmark decisions and thought processes against.

Only leadership will bridge the gap between aspirations, commitments, plans and outcomes. Without consistency, symbolism, alignment of reward and recognition, and core values such as integrity and objectivity, as well as massive common sense, a culture of safety or risk will remain a pipe-dream.

***Other Industries***

Having described a framework for a culture of safety, I now turn to our observations and learning from other industries. I would emphasise again that this is not a subject which lends itself to empirical conclusions, and the comments which follow include by their very nature some broad generalisations. However they are not unsupported theories or opinions; conclusions were formed from multiple touch points with those industries over the last 8 years.

All of the sectors under consideration are subject to extensive regulation, either directly or indirectly. However there are marked differences in the application of supervision; training, assessment and re-validation; SOPs; behavioural training; and approach to execution and leadership. Some of those differences are considered below.

***Healthcare***

Healthcare, in particular emergency care and operating teams, has perhaps the greatest synergy with aviation: cross-functional teams which change every day, working in situations where communication and decision-making routinely have the potential for life or death consequences. Much has been made of the common ground with commercial aviation, and many CRM type programmes have been introduced. However, I would argue that the greater commonality actually exists with military aviation due to the highly reactive nature of the task, which is often inherently unpredictable, and it is therefore impossible to model, mitigate, or 'systemise out' many of the risks in advance.

Organisational: Historically in the UK NHS, organisational factors have probably not been optimal for building a safety culture. At the macro level, the NHS is 'a supertanker' (takes a long time to change direction) without any one team responsible for setting the organisation's direction and culture. Teaching hospitals, individual NHS Trusts, Royal Colleges and the Department of Health will all pull in various directions with different agendas. And let's not forget that this is an organisation of over 1m

people; the leadership challenge is immense. At the micro level, doctors have high standing both within healthcare and in society generally and do a job requiring high intellect and lot of specialist knowledge. This leads to a danger of the 'hero doctor'; teams often are led by a single consultant, and there is little cross-supervision or 'upwards challenge'. Whilst there is a system for accruing professional development points, this does not imply meeting any training standard and until recently there was no formal requirement for any further professional assessment once consultant level was reached. That is now changing though and the increasing use of simulation and focus on leadership and personal development offer potential to nudge the supertanker towards a new direction.

Procedural: The benefits of standardised process are clearly visible in the take-up of initiatives like the WHO surgical safety checklist. In the trial phase, conducted by the WHO in 8 cities around the world, deaths related to surgery were reduced by 40% and complications by more than a third. There can be resistance to the implementation of SOPs and checklists, with people arguing that you need a more flexible approach in dynamic environments. However, experience in aviation shows that standardised processes do not make you inflexible; they are what make you flexible: they eliminate mistakes in basic or safety-critical processes whilst simultaneously 'freeing up your brainpower to the difficult stuff'.

Behavioural: I don't think that it's unreasonable to say that healthcare has been about 15-20 years behind aviation in the adoption of CRM training and techniques. Aviation also suffered from the 'hero captain' until improved data recording and accident investigation techniques started to expose the myth. In many cases, it was not the technical problem which caused the crash, but poor team effectiveness, communication and decision-making in dealing with the problem. However without the formal mandating of initial behavioural training plus refresher courses in the NHS, the supertanker may yet take a while to change course.

Execution: The WHO checklist, by its very nature, starts to introduce a level of task organisation and is the first step in an execution cycle. The other end of the cycle is the debrief process which has started to get some localised traction through After Action Review (AAR). The difficulty in widespread implementation is resistance to feedback combined with scepticism re the value add, not to mention time pressure. It is easier to show the value of a simple briefing since it instantly brings clarity and organisation to the team. The value of AAR is more difficult to demonstrate in the short-term, however to fail to debrief is to commit to make the same mistakes next time.

Leadership: Given the organisational and structural challenges in the NHS, nothing is more likely to add more value in the short-term than outstanding leadership. Until patient safety is both literally and metaphorically right at the top of senior managers' daily agenda, until senior clinicians and managers truly understand the symbolic impact of their personal and behavioural commitment to a genuine no-blame culture; and unless they practice "overt executive sponsorship, 'over-communication', deployment of champions and most importantly, training and reward of the right behaviours" (see previous), then programmes, SOPs and checklists will do no more than scratch the surface.

Overall the NHS appears to have made good progress on the road to a safety culture, in particular with regards to SOPs and improving behavioural awareness. However a complex inflexible organisational structure, and the inherent leadership challenges which go with that, mean that significant obstacles remain.

***Asset Management***

Asset management probably has the least obvious common ground with aviation, and offers perhaps the greatest contrast in the general approach to risk management. Risk in this world is not generally connected with injury or death but the chance of an investment reducing in value or failing to meet a target. These 2 facets are captured in the key variables: return and risk.

Organisational: Even more than healthcare or aviation, asset management is enormously affected by the cult of the hero. Star managers are publicly feted and rewarded beyond their wildest dreams. Whilst large organisations would claim to have sophisticated risk management and governance processes in place, the star culture does not naturally lend itself to cross-supervision and upward challenge. There is heavy reliance on modelling (see below), however although this is in one sense a form of simulation, it does not exercise human stress and decision-making, followed by review and feedback, techniques which add significant value in aviation and medicine.

Procedural: I have limited personal insight into the use of SOPs in asset management, although pre-defined actions in the event of drawdowns, market movements and liquidity limits are generally designed with the intention of mitigating risk could be argued to be a form of SOP.

Behaviour: You get the behaviour you train for and you get the behaviour you reward. The low emphasis on personal development, combined with huge individual rewards directly tied to return achieved, have the potential to produce some fairly predictable selfish and narcissistic behaviours. In contrast to aviation, the risk is not owned by the operators; it is owned by investors, with managers often sharing upside benefits but not downside risks. Alignment of reward with calendar targets which may or may not be relevant to investors, only serves to muddy the waters further. If star fund managers emerge who are objective, disciplined, take a long-term view, and have a genuine deep-seated respect for risk and investors, it may be in spite of and not because of the industry they work in.

Execution: The most interesting aspect of the asset management industry to me in this context is how theoretical models are used to inform decision-making. There is nothing whatsoever bad about this in principle. However the practice probably has some limitations. Any number of models is used to calculate risk, and produce numerical outputs which supposedly give some indication of the likelihood of losing money. One of the most common is volatility, which in general terms, is a measure of the amount by which an asset tends to vary from its mean value over time (time horizon is critical here; if an asset loses short-term value, does it really matter unless you are a forced seller?). Another common term is ‘value at risk’, which is essentially an indication of what percentile falls within certain probability limits for the size of a future financial loss. These are examples of technology (or theory) informing decision-making, just like we described for a fighter pilot. However I also mentioned the different degrees of confidence associated with different data sources, and the requirement for interpretation of information within a wider context. Whilst radar, infra-red and datalink might be to some degree imperfect according to the quality of the sensor and the original source, it is implicitly assumed, with good reason, that flight instruments provide perfect information as to the aircraft performance. The problem arises when technology utilising imperfect input data is assumed to produce perfect output data. Volatility and value at risk are relatively straightforward compared to some financial models, but are still theoretical models which rest on all sorts of assumptions. Looking at risk solely in terms of numbers and models is analogous to the commercial aviation approach in attempting to ‘systemise the risk out’. However in commercial aviation, “the task is fairly discrete, well defined and repetitive, the execution is unlikely to vary too much from the plan and most of the variations

which might cause problems can be identified and modelled in advance" (see previous). How much of that holds true in asset management where the individual asset manager operates in an ecosystem where few of the variables are discrete, there are many hidden correlations, and market movements are the result of possibly hundreds of thousands of individuals making decisions often based on perception, group think, and behavioural forecasts as much as they are based on fundamental evidence? The models are clearly going to contain incorrect and/or unjustifiable assumptions in some situations, which is fine as long as the limitations are well understood and those weaknesses are factored into the human decision-making. Believing that imperfect synthetically generated risk data are perfect is the worst possible scenario – it would be better to have no theory or technology at all. For a pilot, no flight instruments are better than incorrect flight instruments; it is better to simply look outside and use 'raw data' than make decisions based on instruments containing unquantified errors[1]. I would argue that it is impossible to accurately model the risks present in asset management, especially in so-called 'tail events', the once in a lifetime occurrences (or several times in the last few years!) when you need some understanding of the risks most of all.

Rather than placing such store on the number generated by the computer, perhaps a more holistic approach to risk is required in asset management, employing models as just one part of a wider picture including contingency planning, collective decision-making, improved alignment of incentives with both investor time horizons and appetite for risk and reward, strong leadership values and behaviours, and massive common sense.

***Construction, Oil and Gas***

Construction, oil and gas are grouped together since I find that there is remarkable homogeneity in their workforces. At the tactical end of their operations, they tend to be staffed by male-dominated slightly macho workforces who are prepared to get their hands dirty doing difficult dangerous work. That physical and mental toughness, combined with a 'can do' attitude are exactly what is often required in those environments. However that combination is perhaps sub-optimal when it comes to critical self-analysis, giving and receiving feedback, and open honest conversations, which is less than ideal since those are all definitely elements of a safety culture.

Organisation: The three industries have all made remarkable progress in recent years, in improving individual and collective attitudes to health and safety. Although there is some resistance to supervision, it is very much the norm and whilst re-validation of core competency is less common, a heavy emphasis is placed on training and qualifications.

Procedural and Leadership: Clear overt executive sponsorship of safety is common, together with wide implementation of rules, processes and procedures. So is there even an issue to discuss? Well I would argue that the procedural approach to risk has actually gone too far in many companies in these sectors. There has been blanket application of health and safety rules to every aspect of companies' operations. As an example, I have spoken at a significant number of conferences for oil and gas companies and have more than once been warned about protocol for holding the handrail when stepping up to or down from the stage. Is this overt executive sponsorship and consistent application of best practice? Or is it process gone mad? And does it actually improve safety? What are the statistics for lost work days due to injuries whilst mounting the stage at conferences? Is the risk the same walking 3 steps from a stage as walking down a metal grilled staircase on a North Sea oil rig in a force 8 gale? If the emphasis is primarily on compliance with rules and process, then the danger is that taken to an extreme, you start to

[1] Thanks to Pablo Triana for this analogy in his book 'Lecturing Birds on Flying.'

remove any responsibility for individual decision-making and compliance wins over common sense and leadership; in fact compliance becomes the end rather than a means to an end. Personally I think that it is a good thing to be forced to 'load a different cassette' when in the higher risk environment. On military airbases, there is a whole different set of rules in force when you are in an aircraft operating area compared to the headquarters 100m away. You actually walk across a red line which defines that you are now in a different environment and warning signs remind you that new rules apply. Whilst I am a strong proponent of 'how you do the little things is how you do the big things', I am less than convinced that the focus on office safety, handling coffee cups and how to navigate a staircase has a contribution to operational safety; I fear that the opposite may be true.

There is clearly a place for a set of rules and procedures, but it is only one part of the story, and the emphasis on this one aspect in particular in construction, oil and gas carries its own risks. Blanket application of rules and procedures runs a clear danger of desensitising individuals to the 'real' risks.

***Conclusion***

I do not pretend for a minute that the military offers any panacea solution as to how to build a culture of safety or risk management. It would not be difficult to disprove that theory. However at the tactical level at least, the inherent dangers of operating fast-jet aircraft in a changing and reactive environment, and making important decisions faced with ambiguous imperfect information, has led to the evolution of a more holistic approach to risk than is seen in some environments. Compliance with regulation is mandatory, and with SOPs is normal, however these are simply building blocks. Given that it is impossible to systemise the risk out, greater emphasis is placed on empowered decision-making in accordance with a set of guiding principles, and inculcating a way of thinking about risk, which will give individuals the best chance of getting it right in the moment. Other sectors and organisations have different approaches, some of which are definitely best-in-class. And I would not presume to tell somebody else how to do business. However it is my aim to challenge.

For those sceptics who are concerned about a whole new set of problems which might be generated by empowerment and delegated decision-making authority, I conclude with a heart-warming story from a completely different world. I know a lady who is a nursery teacher and is passionate about the benefits of very young children having the opportunity to 'play in the woods'. She believes that that environment offers all sorts of development opportunities not seen in the classroom or traditional play areas. However she is only part-time and when she is not there, some of the other teachers are nervous about taking the children to the woods because of the health and safety implications and the increased potential for an accident. Jane's solution is very simple. She gathers the three year olds around the play area and asks them to work out the dangers and what rules they need to have to stay safe. And with a watchful eye she allows them to self-administer and regulate the management of the risks.

Most people respond very positively to being trusted with decision-making authority and desperately don't want to let either the giver of that authority or themselves down. And you can guarantee that when the operators understand and own the risks, and share the downside, they will be pretty focused on a margin of safety. It's common sense really.

***Summary of key points***

- Risks in predictable stable environments can be modelled and managed
- It is even possible to largely 'systemise the risk out' in some very complex environments, as long as execution can be broken down into discrete actions, and variations from plan and likely contingencies are largely predictable
- Modelling and risk processes are insufficient for higher risk more reactive environments
- For those environments, it is necessary to build a culture of risk or safety, in which the organisational approach and procedures are only one (necessary) part of the story:
    - Organisation: regulation, supervision, training and assessment
    - Standard operating procedures: best practice default options for common scenarios and working environments
    - Behavioural training: building awareness of the impact of one's own behaviour on communication and decision-making
    - Execution: an investment of time and effort in execution excellence through planning, contingency planning, briefing and debriefing
    - Leadership: walk the talk; senior leaders must be seen to reward and recognise risk management and place it clearly at the top of their own agendas

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The input of Dr Simon Brown, airline captain and CRM instructor at Monarch Airways was highly influential in shaping my original thinking about the application of CRM and how to deconstruct the elements of a safety culture.

***About the author***

Justin is Managing Director of Mission Excellence, an organisational performance consultancy specialising in execution. It helps clients to deliver operational change through embedded personnel, development programmes and consultancy with 2 key areas of focus: Operational Excellence and Risk and Safety Management. Methodology is based on consultants' personal experience of delivering results in complex high-pressure environments. The company works with some of the world's most successful organisations including global corporations (e.g. 3M, Accenture, IBM, Procter & Gamble), professional sport (e.g. premiership football, F1, British Cycling), not-for-profit (e.g. NHS, County Councils) and on academic programmes (e.g. 'Masters in Major Programme Management' at Oxford University and 'Executing Strategy for Results' at London Business School). Justin built Mission Excellence from a zero base, managing both business growth and overseeing the development and delivery of consultancy and training services for clients throughout Europe, the Middle and Far East and Africa.

In addition to core Mission Excellence activities, Justin is a renowned presenter. He has addressed Europe's biggest gathering of business leaders, the Institute of Directors' Annual Convention at the Royal Albert Hall, and the Middle East's premier leadership forum, 'Leaders in Dubai', alongside Kofi Annan and Sir Richard Branson. He is a seed investor and founder partner in a retail fashion business, in particular advising on marketing and finance, and is a non-executive adviser on organisational performance and risk management to Inox Global Capital Management, a long/short equities emerging markets hedge fund. Justin previously helped 2 doctors to establish Europe's premier international trauma conference for clinicians, profitable from the first event with negative working capital, achieved

by exploiting corporate sponsorship, a flexible fee model and distribution via internet and social media. He also helped developed strategy and operating models for aviation and internet start-ups and mentors the founder of a community interest business.

Prior to Mission Excellence, Justin's first career was in aviation. He joined the RAF aged 23 and during officer training, was awarded the Wilkinson Sword for outstanding leadership and graduated as top cadet of his entry. After completing flying training, Justin went on to fly the Tornado F3, a front-line air defence fighter aircraft. He has taken part in both training and operational deployments all over the world, including in UN peacekeeping operations in Bosnia. On the Tornado he was qualified to lead any scale of mission in any theatre, and was subsequently selected for the Red Arrows. Justin served for 3 years on the Team performing over 250 displays worldwide including 3 international tours. He was Deputy Team Leader and Executive Officer, responsible for operational day-to-day management of the team, a hand-picked group of 9 elite pilots and 90 support personnel.

He has an MBA with Distinction from London Business School and a BSc (Hons) in physics from the University of Bristol.

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