CAA Safety Assurance Review

Executive Summary

1. Background

1.1 In July 2016, Cranfield University was commissioned to undertake a review of SARG. The primary objective was to highlight best practice versus safety assurance challenges. A phase one report was published on 12th January with eleven interim recommendations and twelve actions for phase two.

1.2 Phase two of the Review further examined the safety assurance challenges facing the CAA - through a cross-cut of SARG, a deep-dive review of AAA and a review of organisational competencies. These helped to inform the review team's understanding of both the challenges and opportunities ahead of CAA, with a particular emphasis being placed on the cultural transformation.

1.3 A total of 62 interviews were conducted in phase two in addition to the 42 carried out during phase one. These were undertaken in confidence and covered a wide range of people from Board Chair to field force. The Cranfield team observed 7 Internal Review Meetings (IRMs) and attended 4 CAA workshops. In addition, documentary evidence was examined from the CAA, as well as academic and industry publications.

1.4 This phase two report is made up of this summary paper plus five appendices which cover:

- Appendix 1: SARG Cross-Cut and AAA Deep Dive Analysis
- Appendix 2: Competencies Review
- Appendix 3: Culture and Safety Assurance
- Appendix 4: CAA Case Studies Methodology
- Appendix 5: CAA Safety Maturity Model

2. Safety Assurance – Opportunities and Challenges

2.1 According to CAP795[1], safety assurance is one of the four elements of a safety management system. *"Safety assurance assesses the safety performance of the organisation and enables continuous improvement. The three aspects of safety assurance are:*

a) Safety performance monitoring, measurement and review;

b) The management of change;

c) Continuous improvement of the safety system"

2.2 Whilst in the context of this review assurance is directed at safety, the principles of performance measurement and continuous improvement have far wider implications than solely safety. Whilst the CAA's first responsibility is to ensure "that the aviation industry meets the highest safety standards[2]", it does so along other responsibilities as the UK's specialist aviation regulator.

2.3 The Board, ExCo and SARG Leadership Team are extremely clear and consistent in their commitment to improving the approach of the CAA to safety assurance. This is not borne out of a sense that it is being done poorly, but rather a commitment to wanting to excel as a regulator and an understanding that in order to do so, safety assurance is a critical pillar.

2.4 By investing in the development of safety assurance both as a methodology and, more fundamentally, as a mindset, the CAA may realise the following opportunities:

- Become a learning organisation;
- Learn from success as well as failure;
- Identify areas for further attention on which to focus its resources;
- Share lessons across the organisation;
- Share lessons with its peers and regulated entities;
- Create a roadmap for improvement in its safety maturity;
- Set short and longer-term safety ambitions;
- Honestly assess the organisation's progress;
- Compare itself against its plan and against its peers.

2.5 However, in order to embrace these opportunities, there are also a number of challenges to be addressed. To better understand the nature of these challenges, three activities were undertaken:

- A cross-cut review of SARG and a deep-dive into the AAA Capability Area (Appendix 1)
- A review of safety assurance related competencies (Appendix 2)
- A review of the cultural elements of relevance to safety assurance (Appendix 3)

[1] https://publicapps.caa.co.uk/docs/33/CAP795_SMS_guidance_to_organisations.pdf

[2] https://www.caa.co.uk/Our-work/About-us/Our-role/

2.6 The greatest challenge may be characterised as culture, and its implications are summarised below. (Appendix 3 identifies the specific challenges and developments in further detail):

- Differing perceptions exist across the organisation, some based on 'myths and legends' about how the CAA *used to* operate and behave.
- Some anxiety about sharing feedback internally in spite of the organisation's efforts to engender a Just Culture.
- The effects of a legacy culture which appears to have discouraged challenge; feedback was considered to be criticism and staff were very defensive. Colleagues should be supported by a culture where they are encouraged to raise safety concerns, where feedback will be provided and action taken where appropriate. When this route fails there should be an internal, independent and appropriately resourced system in place to enable confidential reporting.
- It is practically impossible for CAA to employ experts in all of the areas it has responsibility for, despite societal expectations to the contrary.
- Retaining technical knowledge can be difficult where staff turnover is high or expertise is scarce.
- Full implementation of Performance Based Regulation (PBR) will, in time, create the opportunity to do more with less. However, during the transition, it can also create additional workload.
- As in most organisations, many subordinates think their management think differently than they actually do.
- Many acknowledge the positive and proactive approach taken by the current Board and LT to communicate with the organisation, although some felt that there was an opportunity for even more engagement.
- A period of major organisational change created the risk of an inevitable loss of corporate memory. This highlights the importance of knowledge management and in documenting decision-making.
- Some colleagues felt more comfortable with the way the CAA <u>used</u> to operate. However, there is also increasing recognition that this is no longer possible and a growing enthusiasm towards the new environment.

2.7 The CAA has made a great deal of progress in terms of aligning its structure and culture to best support and benefit from Performance Based Regulation. Observations regarding this progress are as follows:

- The development of the Regulatory Safety Management System (RSMS) acknowledges both the relevance of a traditional SMS to an organisation such as the CAA, and the specific differences created by being a regulator rather than an entity. Continuing to refine the RSMS is important to its viability and usefulness.
- There is a high degree of recognition amongst the Board, ExCo and LT that cultural change is a fundamental and necessary element of the transformation programme.
- Staff development interventions in support of this change have had different degrees of success. High engagement amongst the LT has not always been replicated at the front line.

- The LT have initially been more willing to embrace the cultural transformation than some of the frontline staff.
- Staff will naturally go through each stage of the transition curve at their own pace.
- Structural changes which resulted in some roles moving into the Shared Service Centre (SSC) were not universally welcomed.
- In order to meet financial challenges, principally major pension contributions increases, the SSC was tasked with delivering a certain level of service within the context of a challenging headcount reduction. To achieve this, initial focus in the SSC had to be in terms of those cost savings which did not negatively impact on safety roles.
- These changes were coincident with, but not part of the change to Performance Based Oversight (PBO), but appear to have led initially to a greater focus on finding efficiencies rather than delivering service quality.
- The problem has been recognised and improvements have occurred over the last year. However, some colleagues commented that this has left the legacy of a loss of confidence in the SSC within SARG, which can lead to defensive behaviour within some of the SSC management team.
- Decision-making is necessarily becoming more collaborative and colleagues are beginning to see greater benefits from such an approach.
- Processes such as the IRMs facilitated by the PBR team are a good example of creating a culture where different perspectives are considered to be of greater value than leaving things unchallenged, and in the hand of single 'experts'.
- Some colleagues spoke of change fatigue and being overwhelmed by the amount of change that was being attempted compared with the resources available, rate of staff turnover, capacity needs to deal with 'pop-up events' and the time needed to do their job properly.
- On occasion people spoke of 'resource' in the context of staff numbers, but probing generally revealed that capacity (time and skillset) were more limiting factors.
- The organisation's work on Just Culture is promising, but not fully embedded across the CAA, even though the CAA's own safety culture survey may seem to contradict this assertion.
- There seems to be an increasing willingness to take enforcement action where appropriate, although the implementation remains inconsistent.
- There are good examples of how the CAA is taking a more innovative approach to solve challenges such as the recruitment of staff.
- Work being undertaken to better define safety accountabilities has strong potential. This will help to address concerns from colleagues that not all parts of the CAA understand how they contribute to the organisation's objectives.
- There is an increasing recognition of the importance of training and career pathways as part of staff retention.
- The Airworthiness Capability Area was frequently cited as an exemplar of embracing PBR principles. This was largely thought to be a function of leadership style and how this translated into the team's approach.

Evaluating and benchmarking safety assurance

2.8 The CAA has demonstrated bold leadership in pioneering Performance Based Regulation; something which is acknowledged and respected by its peers around the world. However, this means that there are few organisations that are similar enough to provide useful direct comparison

2.9 There are useful comparators in other sectors for at least some elements of what the CAA is trying to do. These include aviation and non-aviation safety regulators such as the Office of Road and Rail (ORR), industry bodies such as the World Association of Nuclear Operators (WANO) and others (e.g. Shell Aircraft). Greater benefit comes from identifying elements of similarity than finding reasons to be excluded based on differences. (Further details are provided in Appendix 5.)

2.10 A shift from 'only' compliance-based regulation to full performance-based regulation requires structural, procedural and, most significantly, cultural change. To attempt to regulate in such a fundamentally different way without major changes in the beliefs, values, biases and therefore resultant behaviours across the organisation would be unrealistic. There is recognition and enthusiasm from the Board, ExCo and LT of the need to change the culture in order to achieve the organisation's objectives.

Safety Maturity Model (SMM)

2.11 To provide a method for the CAA to evaluate its progress towards ambitious goals as the world's leading aviation safety regulator, the Cranfield team developed the 'Safety Maturity Model' (SMM). The Model is formed of 3 *Sections*, which are further divided into 12 *Elements* as follows:

Section:	1: Culture & Competence	2: Leadership & Governance	3: Risk Assessment & Management
Element:	Understanding	Policy & procedures	Relationships
	Mindsets & behaviours	Leadership & governance	Gathering & analysing safety risk data
	Competence & training	Work management & resourcing	Safety risk information assessment & management
	Learning	Performance management & review	Informed decisions to deliver safety outcomes

Figure 3.1: The 3 Sections and 12 Elements of the SMM

2.12 Many organisations would not have sufficient cultural maturity to use a model such as this. The willingness of the CAA to develop and implement the Safety Maturity Model speaks very positively about the organisation. However, for the model to be of benefit, it must be used to set targets for, as well as to measure, change over time. Thus, each *Element* is rated from 1-5, representing improving culture and increasing consistency:

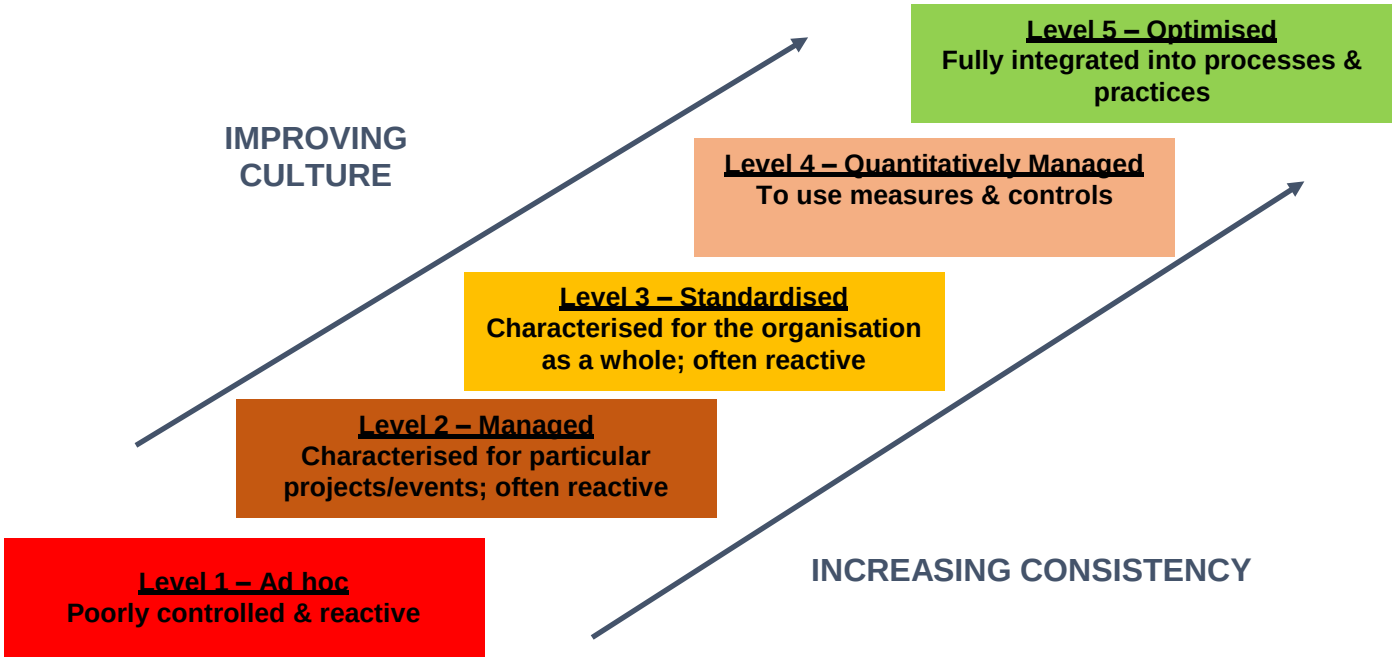

Figure 3.2 **Concept of Increasing Safety Assurance Maturity**

2.13 Rating the CAA against the SMM is not without its complexity. The first challenge is to assess whether the organisation is mature enough to cope with the maturity score for each section and element. In other words, an organisation which is rated to the far left of a maturity model such as this may not have the level of maturity to recognise or acknowledge its own deficiencies.

2.14 Conversely, an organisation which receives an initial rating to the far right of a maturity model is likely to have failed to set itself a sufficiently ambitious target for change. It is at risk of being either under ambitious or complacent about what superior performance looks like. A rating of less than '5' in any category does not mean that the organisation is deficient.

2.15 Even more important than the initial rating is the evidence that is presented to justify it. In developing suitable processes to collect such evidence in a timely and accurate fashion, the organisation will enhance its ability to deliver safety assurance. The responsibility for providing such evidence should lie with the area being assessed (e.g. a Capability Team) with the Safety & Business Assurance team providing scrutiny and moderation. Scoring at organisational level only may not provide enough granularity to focus on improvement activity.

2.16 The rating is designed to identify areas for further improvement and opportunities to share best practice within the organisation. It is for the LT, ExCo and Board to prioritise

the areas for improvement, as it is arguably more critical that some areas rather than others gain maturity more quickly.

2.17 Appendix 5 describes the steps to implement the SMM, including how best to develop a meaningful comparison with other relevant organisations. Being able to share the Model more widely will help to develop a community of peers, which in turn may provide additional external safety assurance.

CAA Case Studies Methodology

2.18 To provide a tool for better understanding the way in which the CAA is executing its function, the review team developed a methodology which blends social science methods with contemporary accident investigation tools. The tool is intended for use either by the Safety & Business Assurance Team or an external organisation.

2.19 The review team examined three examples of internal reviews that had been undertaken by CAA in recent years. Each provided useful insights which in turn helped to refine the methodology. Full details of these 'deep dives' along with a detailed description of the recommended methodology can be found in Appendix 4.

2.20 The sole purpose of a Case Study is to identify opportunities for continuous improvement. Findings should focus on systemic improvements rather than individual performance and may include observations about better-than-anticipated system performance as well as any deficiencies.

2.21 A Case Study shall focus on those areas of greatest risk to the CAA or which may yield the greatest opportunities for improvement.

Resourcing Safety Assurance

Safety and Business Assurance Function

2.22 In 2017, the CAA formed the Safety and Business Assurance team under Troy Preston. This is an important capability both in terms of providing Assurance to the LT, ExCo and Board, and also in delivering the cultural change required to develop an authentic approach to continuous improvement. The team needs to be seen to be credible (both internally and externally), objective, trusted and functionally independent.

2.23 The team will be responsible for a blend of planned- and responsive-mode activities, including (but not limited to) reviewing evidence presented from across the CAA to evidence the scoring of progress against the Safety Maturity Model; conducting Case Study reviews (programmed and in response to 'pop-ups'); providing input into competency development; commissioning periodic external safety assurance review activity; and sharing of lessons learned across the CAA.

2.24 The team would benefit from a core team, supplemented by longer-term secondees and the ability to second additional resource at short notice in response to 'pop-up' events. The longer-term secondees are envisaged to be experienced CAA staff on a secondment of 2-3 years. They would be involved in conducting Case Studies and as such would need training to develop the appropriate skillsets as proposed in the Case Studies methodology (Appendix 4). At the end of the secondment, it is anticipated that they return to a Capability Area and share their approach to continuous improvement, which in turn will help to embed this as a normal behaviour.

Safety and Business Assurance Team Competencies

2.25 The Safety Assurance team needs to have its own set of competency requirements if it is to deliver its function effectively. These are in addition to the competencies required to deliver Performance Based Oversight and are particularly focused on their approach to identifying opportunities for improvement in a way that is about learning, not blaming.

2.26 The team should be able to demonstrate that they are evidence-led; objective in their analysis; willing to go beyond the immediate explanation in order to identify organisational and systemic factors; and able to communicate their findings in a way that maximises the likelihood of positive change.

2.27 The team need to be creative in their thinking; able to rationalise competing perspectives and interests; be able to communicate clearly and in a trustworthy and confidence-inducing manner to all levels of the organisation and beyond. The team will play a crucial ambassadorial role in living the values of an organisation that aims to reach level 5 of the Safety Maturity Model.

Organisational Cultural Transformation

2.28 Arguably the most significant element of safety assurance is delivering the cultural change that is required to move the organisation to level 5 – optimised 'fully integrated

into policies and procedures' according to the Safety Maturity Model. The Safety Assurance Team will play a pivotal role in monitoring and driving this cultural shift. Whilst maintaining sufficient independence in their activities, the team needs to establish itself as a core part of the way in which the CAA functions.

2.29 The team should be visible and accessible both internally and to the wider community. Lessons that have been shared need to be followed up to ensure that they are also learned, and that those who provided input into the team's activities are given sufficient feedback. This should also include open and honest engagement with external organisations including peers for comparison and the regulated entities. Additionally, an independent & appropriately resourced system is required to enable colleagues to raise concerns internally.

Developing Broader Capability

2.30 The findings of the cross-cut of SARG; deep dive of AAA; the competencies review; and the review of culture and safety assurance provide a wealth of opportunity for improvement, or to build on existing good practice. However, collating this information involved a great deal of effort by an external team. Whilst such an external view can be extremely valuable, it is important to develop as much of this capability in-house as possible.

2.31 The continuous improvement element of safety assurance can be embedded by developing a programme of work based upon moving to the right hand side of the Safety Maturity Model. Whilst some of the work will focus on developing processes and supporting tools, it is work around individual skillsets and, more collectively, the organisation's culture that will accelerate improvement.

2.32 There is a growing recognition of the need to recruit or develop new skillsets for CAA colleagues, especially in working as a team to make and document better decisions; giving and receiving constructive feedback (internally and externally); and fully embracing the principles of Performance Based Regulation.

Appendix 1
SARG Cross-Cut & AAA Deep Dive Analysis

1. Background:

1.1 In July 2016, Cranfield University was commissioned to undertake a review of SARG. The primary objective was to provide assurance that SARG is meeting its objectives, particularly in relation to the undertaking of Performance Based Oversight (PBO), and to identify any gaps or areas that should be targeted for improvement. Additionally, Cranfield was requested to propose a bespoke methodology for CAA safety assurance activities that could be embedded as an ongoing function.

1.2 As part of Phase 2 of this Safety Assurance Review and to achieve these objectives, Cranfield was asked to undertake an oversight and organisational review, which it was agreed would take the form of a cross-cut of SARG and a deeper dive into the Airspace, ATM & Aerodromes (AAA) Capability Team (CT).

1.3 The activities of Phase 2 of the Safety Assurance Review have been wide-ranging as the team have studied a broad range of issues which relate to safety assurance. Key insights and recommendations are highlighted within this paper. Additionally, the SARG cross-cut & AAA deep dive review has been used to inform the development of the CAA Safety Maturity Model (see Appendix 5), the Case Study methodology (see Appendix 4) and the "Trigger Criteria".

1.4 Data have been obtained from a variety of sources which include: attendance at Internal Review Meetings (IRMs), colleague interviews, document reviews and meetings both within and outside the CAA. External input has included: discussions with the Health & Safety Executive (HSE), Military Aviation Authority (MAA), Office of Rail and Road (ORR), Rail Safety & Standards Board (RSSB) and European Aviation Safety Agency (EASA).

2. Objectives for Safety Assurance

2.1 The CAA's Regulatory SMS Assurance Procedure (RSMS-PR-002) suggests that safety assurance may be achieved through the provision of objective evidence that:

- The basic elements of the aviation system meet at least a minimum safety standard.
- There is nothing foreseeable that is likely to cause an accident.
- The outputs of the CAA that matter to safety are correct and effective.
- The identification and dissemination of best practice is carried out.

2.2 Phase 1 of the Cranfield Safety Assurance Review highlighted the many demands placed upon National Aviation Authorities (NAAs) which require them to continually re-invent themselves. Even for NAA's which adopt ICAO's Standards and Recommended Practices (SARPs) without revision or Notification of Difference, their role is challenged by external pressures from government, industry and society. The methods by which NAAs execute their function are open to challenge both by those who consider them to be administratively or financially burdensome and, when things go wrong, by those who felt that the NAA had not gone far enough.

2.3 For a regulator such as the UK Civil Aviation Authority, which has committed itself to go beyond prescriptive rules, regulations and standards in order to deliver further improvements in safety performance, the challenge is rather greater. To become more focused on targeting areas of remaining or emerging risk, the CAA needs to become more ambitious through an intelligence-led approach. This is, by its very nature, harder especially as minimum regulatory standards must also be met.

2.4 In the UK's case, the challenge is influenced by the Government's Better Regulation Principles and Red Tape Challenge which require regulators (including the CAA) to reduce the regulatory burden by focusing on the core principles of proportionality; accountability; consistency; transparency and targeting. This also needs to occur within the context of CAA's European and International obligations through EASA and ICAO.

2.5 For a 'traditional' NAA to evidence that it is delivering its obligations at the appropriate level is rather different from one such as the CAA, which is attempting to lead a transformation agenda. Where auditing process such as ICAO's USOAP / CMA may provide a level of external safety assurance for NAA's, their emphasis is on implementation of SARPs and associated procedures. For a forward-thinking NAA which is attempting to realise some of the more ambitious elements of ICAO's Annex 19[1] and Global Aviation Safety Plan[2], providing safety assurance is much more difficult.

2.6 Notwithstanding the level of difficulty, it is entirely appropriate that the Board and Leadership Team should be able to satisfy themselves that the CAA is executing its

[1] ICAO (2013) Annex 19 to the Convention on International Civil Aviation: Safety Management. Montreal
[2] ICAO (2016) Global Aviation Safety Plan 2017-2019. Doc 10004. Montreal

functions to an appropriate level. Moreover, it should also be able to communicate this to its stakeholders, many of whom have differing expectations of what 'appropriate' looks like – both compared to each other and at different moments in time.

2.7 To be able to make such a judgement, a range of factors were highlighted in Phase 1 as being important considerations. Any methodology for safety assurance needs to balance:

- **Scale** – to what level of fidelity can assurance be provided?
- **Reliability** – what level of sampling is required to provide a reliable insight?
- **Repeatability** – can the measures be used again to identify changes?
- **Resource requirements** – what are the sources of evidence available and how are they interpreted?
- **Latency** – how quickly does safety assurance activity report its findings?
- **Demand for information** – who wants what type of information and for what purpose?
- **Balance of quantitative and qualitative measures** – what is the appropriate balance of evidence and how are the different types reconciled?
- **Comparability** – what comparisons are to be used to assess what 'appropriate' looks like?
- **Access / willingness to share information** – is it possible to access information, especially where it may reveal weaknesses or deficiencies?
- **Readiness** – is the organisation ready for feedback it may receive from such a process, especially during a period of change?
- **Discoverability and implications on liability** – does the organisation create new problems for itself by creating a process which is naturally self-critical?

2.8 These factors and others influence the approach to be taken to identify how the organisation is functioning and whether it is at an appropriate level. Any Safety Assurance Review such as the one conducted by Cranfield is likely to identify areas for development: To fail to do so would be unthinkable. However, this does not imply that the CAA has failed to perform at an appropriate level. The answer to that question is the responsibility of the Board and LT and may ultimately be judged externally, e.g. through the courts or parliament.

2.9 The aim of the cross-cut of SARG and the deep-dive analysis of one Capability Team (AAA) was to provide additional granularity to the observations made in the Phase 1 report, and to provide insight for the development of CAA's ongoing safety assurance approach. The observations are viewed in the context of the CAA's journey towards full PBO implementation where three layers of increasing sophistication are achieved to deliver:

- Compliance
- Safety Data Collection, Analysis and Exchange
- Data-Driven Targeting of Oversight of areas of Greater Concern or Need

3. Evaluating SARG's Safety Assurance Achievement Level

3.1 The **four objectives** described in the CAA's Regulatory SMS Assurance Procedure (RSMS-PR-002) are used to frame the findings of the cross-cut of SARG and deep-dive of AAA (see para 2.1). They are presented as four sections below.

4. Objective One: The basic elements of the aviation system meet at least a minimum safety standard

4.1 The CAA is highly regarded internationally for its effective implementation of the Standards and Recommended Practices of ICAO. This was reflected in its above global average safety performance in the most recent Universal Safety Oversight Audit Programme (USOAP) audit which was conducted by ICAO in 2009. Figure 1.1 illustrates the UK's performance compared with the global average and that of the USA (which was audited in 2007).

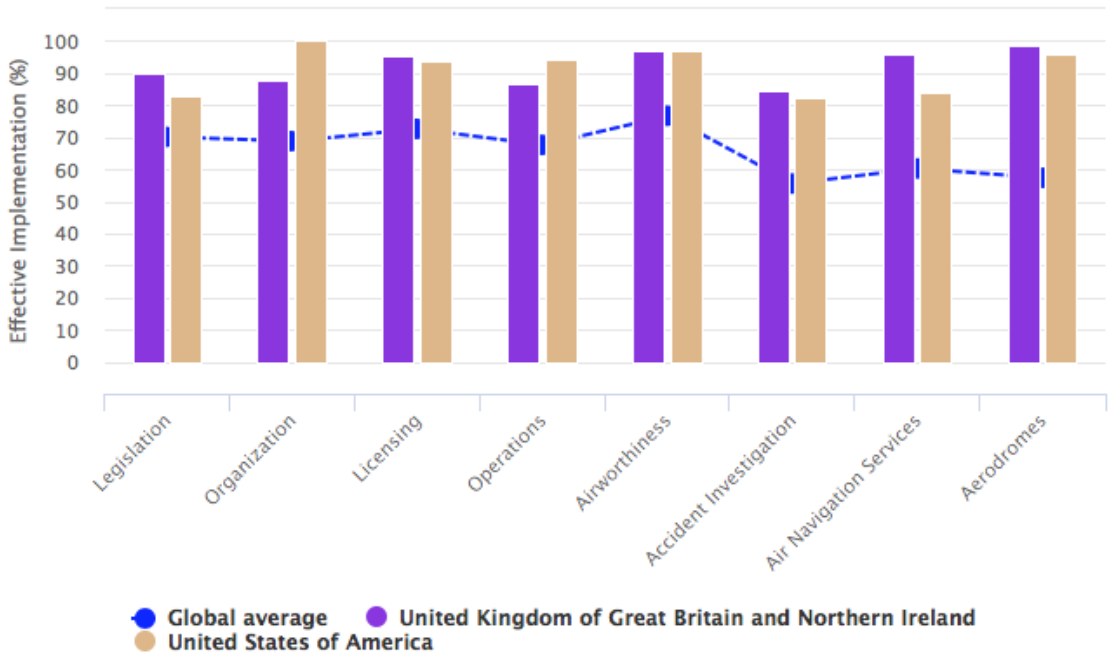

Figure 1.1 USOAP score for UK and USA compared with Global Average. Source: ICAO

4.2 It is also highly regarded by EASA, which has conducted more recent audits of its effectiveness. However, this does not mean that EASA has not made findings against the CAA. The nature of these findings range from a lack of evidence that the CAA has procedures in place to support a specific task (e.g. mutual exchange of information; oversight programme; SAFA procedure) through to non-compliance with regulation or out of date procedures (e.g. Regulation 1149/2011). The majority of these findings were resolved swiftly and do not appear to highlight any deep systemic issue. The fact that findings were made is not ultimately negative – audits that find nothing are arguably doing little to add value to systems which are unlikely to ever be 'perfect'.

4.3 These established audit processes provide a certain level of external assurance. However, the latency of their feedback can, however, be high. (For example, the last ICAO USOAP audit was in 2009 – prior to any of the work on Performance Based Oversight.)

4.4 Notwithstanding the strong historical performance level, a number of vulnerabilities that either have had, or which have the capacity to have, a negative impact were identified during the Review, including:

- **Staffing levels** – Slow or unsuccessful recruitment had left some areas understaffed against their budgeted profile (e.g. Flight Operations, SSC). This created a strain on existing staff to be able to deliver the programmed level of work.
- **High staff turnover** – Certain areas of the CAA (not limited to SARG) had experienced a high turnover of staff for a range of internal and external factors. The organisation's understanding of the factors that contribute to this turnover are not fully developed which may negatively impact upon efforts to address it. (Note: Appendix 2 provides further insight into this issue.). High staff turnover impacts upon the following three areas:
  - **Knowledge retention** – Where experts have left the organisation, it has often resulted in expertise being lost. On occasion this has been resolved through hiring of staff back on a consultancy basis. This highlights the importance of documenting decision making and a need for improved knowledge management processes.
  - **Staff development** – High staff turnover has led to a relatively high proportion of staff being under training at any one time. In some areas, staff have then moved into other parts of the business before a return on training investment has been realised. For example, where some see the SSC as an excellent starting point for recruitment into other parts of CAA, the SSC felt frustration that staff did not stay in their role long enough to deliver full value.
  - **Loss of contact network** – When staff turnover is high, there is a loss of efficiency that can come from constantly changing networks – in simple terms, in knowing who to speak to about a particular issue.
- **Reliance on single point of failure 'experts'** – Partly as a consequence of a very wide remit and partly the result of being 'an organisation of experts', there is a double vulnerability from either depending on the unchallenged judgement of a single expert or from the sole expert leaving the organisation (see knowledge retention). This point is partly being addressed through a more collaborative approach to decision making.
- **Lack of challenge culture** – Many staff felt that the CAA did not have a healthy culture of challenge internally. Instead feedback was

Key Points / Insights / Recommendations:

The CAA's ability to meet minimum safety standards may be influenced by factors including:

- Staffing levels
- Staff turnover
- Reliance on single point of failure experts
- Lack of challenge culture

It is recommended that the processes for documenting decision making be reviewed. An improved knowledge management process is required. **[REC 1]**

felt to be criticism and often taken personally. Whilst there is a concerted effort to change this, it has clearly had a strong influence on the way people work and consequently negatively impacted on their willingness to point out deficiencies within the CAA (See Appendix 3).

- **Errors or delays which occurred during the SSC transition** had a direct impact upon basic elements of the aviation system. Specifically, errors made during the issue of flight crew licences and delays in processing Mandatory Occurrence Reports (MORs) negatively impacted on the ability of the CAA to meet minimum required standards. These issues have now been resolved although there remains lost confidence by SARG colleagues in the SSC function as a consequence.
- **Quantity versus quality**, particularly in terms of the transactional work conducted by the SSC, remains a concern. An initial focus on processing volume, headcount and cost reduction led to deficiencies such as noted above. Although efforts to redress this imbalance have been made, close attention should be paid to ensure performance metrics do not drive behaviours which negatively impact on the ability of the CAA to achieve its safety objectives.
- **Balancing CAAi commercial work with 'the day job'** – this was a sensitive subject for some staff as they felt that the attraction of external income was placing excessive demands on their time and therefore their ability to do their main role properly. This was counterbalanced by the resource that is effectively paid for by CAAi by returning profit into CAA. Ensuring this balance is appropriate is key.
- **Silos to stovepipes** – some staff expressed a view that whilst organisational changes had had a positive impact in removing some of the old 'silos', the unintended consequence was that it had instead created new 'stovepipes'. Whilst this is a risk in any organisational redesign, care should be taken to ensure that structure drives the right behaviours.
- **Dealing with deficiencies** – There is some evidence that the CAA appears to have historically had a culture of individual blame rather than organisational learning when mistakes are made or where deficiencies are found. Whilst there is evidence that the culture is changing at the LT level, others cited middle managers who did not share their approach. Internal reporting systems to identify deficiencies seem underdeveloped compared with what may be found in operating entities. Feedback given to reportees is crucial to develop trust and assurance that their contribution initiates change and makes a difference.

Key Points / Insights / Recommendations:

The CAA's ability to meet minimum safety standards may be influenced by factors including:

- Errors or delays during SSC transition
- A focus on quantity over quality
- Balancing CAAi commercial work with the 'day job'
- Silos becoming stovepipes
- The way in which CAA has dealt with its own deficiencies

An independent & appropriately resourced system is required to enable colleagues to raise concerns internally **[REC 62]**.

Close attention should be paid to ensure performance metrics do not drive behaviours which negatively impact on the ability of the CAA to achieve its safety objectives. **[REC 2]**

A review of the demands of CAAi requirements vs the benefits to the CAA of facilitating this work should be undertaken to ensure the balance is appropriate. **[REC 3]**

5. Objective Two: There is nothing foreseeable that is likely to cause an accident

5.1 Proactive safety management requires organisations such as the CAA to make informed decisions about sectors, entities and individuals who have the potential to cause an accident.

5.2 In the context of contemporary safety regulation, this is achieved through 'Safety Data Collection, Analysis and Exchange'. This has been a major focus of the PBO transformation. A good example of how this translates into SARG activity is through the Internal Review Meeting (IRM) process. Several IRMs were observed by the Cranfield Review team including the General Aviation Approved Training Organisations (sector) IRM and entity IRMs.

5.3 IRMs for each entity take place on a regular, scheduled basis. This is chaired by the Oversight Manager (OM) for the entity (or sector) in question. The OM is determined by the privileges held by the entity which may mean, for example, that a Flight Ops OM chairs IRMs that also include privileges that fall under the Airworthiness CT.

5.4 IRMs benefit from a standard agenda and are attended by a multidisciplinary team of inspectors, surveyors and inspecting officers, who are involved in the oversight activities of the entity (the Oversight Team). The OM chairs the meeting, but a representative from the Performance Based Regulation (PBR) team facilitates, with the benefit of ensuring consistent standards between IRMs and of providing peer-review / challenge.

5.5 The IRM agenda is as follows, as described in the PBO Guidance Pack:

- *Overview of the entity*
- *Discussion of data and intelligence for the entity*
- *Review of the completed Safety Review record, Sector Manager Summary and Actions from previous Accountable Manager Meeting*
- *Active Safety Review - check for accuracy, errors or omissions of data*
- *Check accuracy of Key Personnel*
- *Compare current and previous scores for assessment privileges, review changes*
- *Review current Safety Risks and add new risks as necessary. Review risks from previous report*
- *Discuss and record the SMS assessment privilege confidence levels*
- *Accountable Manager Meeting preparation*
- *Privilege Analysis (Review ongoing oversight)*

5.6 The intelligence package, delivered by the ISP Intelligence team, includes analysis of a wide range of operational and safety data, including the profile of the entity, traffic numbers, MORs and

whistleblowing reports if applicable. This highlights the critical task that the Intelligence team play in identifying relevant information and presenting it in a meaningful and unambiguous way. Where the Intelligence Partner attends an IRM, this role continues within the meeting to avoid misinterpretation of data or trends (for example, to identify that number of events is not necessarily reflective of their criticality). The way that the Intelligence team member interacts with the OM and PBR colleague is crucial to a successful outcome.

5.7 The safety data presented in the intelligence package is generally based on lagging indicators of safety performance. Whilst this can provide useful insight it must be combined with expert judgement if it is to be used proactively. Future development may consider what leading indicators of safety performance may be exploited to enhance proactive and, ultimately, predictive safety management.

5.8 The volume and quality of safety data presented at the IRMs appeared to be very high. However, there are also occasions where there is very limited data available for particular entities (for example, because they are a small or new organisation). This highlights the importance of taking a cautious approach to entities for which there is limited recent intelligence.

5.9 Similarly, some staff raised concerns about the lead-time for safety intelligence, which does not always reflect rapid changes in entity performance. Whilst there was acknowledgement that this situation has improved considerably, it also emphasises the importance of the group discussion at the IRM which should be intelligence-led and not data-inhibited. In other words, where recent developments or field force insight appear to contradict safety data, this should be explored and possibly reflected in a conservative approach to confidence levels. Where colleagues are unable to attend IRMs there is the potential for a loss of insight, especially as it may be up to 12 months between their attendances.

5.10 To maximise the effectiveness of the IRM, the Oversight Team complete a set of questions within the Entity Performance Tool (EPT) prior to the meeting. A number of questions are generic for all approvals, and these are supplemented by approval-specific questions, e.g. for AOC, Part M, Part 145, Part 21 etc. Each area has multiple key headings such as Churn of Staff, Change Management, Safety Culture, Safety Reporting etc. This allows the IRM conversation to focus on review rather than merely identifying a need further information and therefore delay.

5.11 Confidence levels for each element of the EPT are then amalgamated and weighted to give an overall confidence score. This is then actively

Key Points / Insights / Recommendations:

The Intelligence team has a critical role to play identifying relevant information and presenting it in a meaningful and unambiguous way.

The benefit of the Intelligence Partner attending IRMs was noted; consideration should be given to facilitating more regular attendance. **[REC 4]**

Future intelligence pack development should consider what leading indicators of safety performance may be exploited to enhance proactive and predictive safety management. **[REC 16]**

reviewed at the IRM and any changes in confidence level recorded. A summary of (normally) five top risks are recorded in the EPT and agreed before the meeting is concluded. Note that it is possible for more than the 'top five' to be recorded so care should be taken to ensure that other risks of similar magnitude are not obscured e.g. by setting a criticality threshold.

5.12 A possible outcome of an IRM is an 'increased oversight' decision. This has implications for resourcing, but this is a management issue that rightly sits outside the IRM agenda. Care should be taken to ensure that where IRM outcome result in a demand for increased resourcing, this is assessed based on safety risk and that there is sufficient organisational resilience to support the demand.

5.13 The effectiveness of the safety data and intelligence that underpin processes such as IRMs is, in part, dictated by the features and efficacy of tools such as EPT and Q-Pulse. Whilst the current tools appear to be 'fit for purpose', they can be improved and therefore be even more effective. Feedback from users included concerns about functionality (e.g. inability to store images in Q-Pulse, history of previous (closed) findings not stored, limited search capability). This will be addressed, in part, by means of the EPT Phase 3 project, scheduled to deliver functionality enhancements and defect rectifications by March 2018. Training for staff in how to use the tools is also an important element.

5.14 In addition to information sources such as MOR's, Audit/SAFA findings and Whistleblowing reports, the CAA is also able to use several other mechanisms. Organisations such as CHIRP (Confidential Human Factors Incident Reporting Programme), UK Maintenance Error Management (MEMS) Group, UK Airprox Board, UK Flight Safety Committee, which are completely or partially funded by the UK CAA, are good examples of how a regulator such as CAA interacts with the industry that it is regulating and gathers intelligence in many different ways. This increases the CAA's ability to listen to the industry to be more proactive in identifying systemic issues. In doing so, it is also able to communicate its mitigation strategies in an effective way to achieve successful implementation.

5.15 In summary, there are robust processes in place to anticipate and mitigate against reasonably foreseeable events. However, some of these processes can be further enhanced and refined. Ensuring that existing processes can adapt to capture new and emerging risks is important.

Key Points / Insights / Recommendations:

When an IRM outcome demands increased resourcing, care should be taken to ensure that this is assessed based on safety risk. A standardised process should be in place to enable this. **[REC 24]**

Resilience within capability areas to support demands for increased resources should be considered within business planning. **[REC 32]**

Q-Pulse data should be systematically reviewed & analysed by all capability areas in order to enable a focus on key risk areas **[REC 83]**.

A review of the Q-Pulse system and potential system enhancements should be undertaken to mitigate the potential for loss of corporate knowledge & to enable a link to EPT. **[REC 10]**

6. Objective Three: The outputs of the CAA that matter to safety are correct and effective

6.1 Accidents and serious incidents provide the ultimate indication of the effectiveness of safety management, both at entity level and in terms of regulatory oversight. However, societal expectations, particularly for commercial aviation, dictate that measuring the output of a safety system in this way is inappropriate. The expectation is that, as the UK's specialist aviation regulator, the CAA has ensured that the aviation industry has met the highest safety standards.

6.2 To ensure that it is able to address this challenge, the CAA has committed to developing a 'Safety & Business Assurance' capability. Perhaps more importantly, the Board and LT have also committed to developing and embedding a safety assurance mindset across the CAA. This must encompass all of the elements that contribute to achieving the organisations safety objectives – in other words, it does not only relate to SARG, but also to support functions such as HR and SSC. It has also required a change from being an organisation which provides safety assurance of *others* (such as entities) to one which is also concerned with providing assurance that *its own activities* are correct and effective.

6.3 An important element of the safety assurance mindset is the way the CAA asks critical questions of itself to identify areas which may be deficient or vulnerable. To develop this line of questioning, the Cranfield Review team worked with the CAA LT and subject matter experts to develop a set of trigger criteria which might provide flags to indicate where further safety assurance review activity should be undertaken.

6.4 Four main themes were suggested by the CAA, by email received on 14 March 2017. After discussion about how best to use these themes, it was suggested that they could form high-level "parent" categories, beneath which a set of sub-questions was developed. The parent categories were determined to be:

- CAA's proximity to the risks
- Behaviours and relationships
- Safety Data
- Environmental factors

6.5 The parent categories and sub-questions were further developed in collaboration with the CAA into a consolidated set of 14 themes:

Key Points / Insights / Recommendations:

Developing & embedding a safety assurance mindset across the whole organisation, not just SARG is extremely important to realising the CAA's ambition. **[REC 90]**

Ref	Theme
1.	**Lack of financial information included in IRM process/decision making process:** questions around the impact of this / benefit of having it in future should be asked of all field force & a RSMS SME.
2.	**Embedding of the RSMS**: For example, are you aware of the process for raising risks? Do you use it? Is it user-friendly? Is it embedded in your area? Questions that should be asked of all field force and ISP interviewees to get a balanced cross-SARG view.
3.	**The decision making process re what MORs get closed on receipt,** whether this decision is periodically reviewed and whether the associated risks of these decisions are actively logged/tracked.
4.	**TNAs that exist in each department & whether these are centrally coordinated:** members of the management team for each area should be asked about this as it is their responsibility. E.g. what processes are in place for new-starters, job movers & refresher training? Are these formalised processes? Are they local to your department or part of a wider SARG strategy?
5.	**How good is each area at working outside of their silo, outside of the formal IRM process:** every person interviewed could be asked how good their area is at sharing intelligence and if they need input from another department how easily this is achieved.
6.	**Change Management Process:** including how the COO process marries with the RSMS change management process, how embedded it is, etc. A rep from the Change Management team and a RSMS SME would need to be interviewed.
7.	**Resource in every area:** e.g. is it sufficient & is the work prioritised correctly in that person's view? Every interviewee could be asked this question, to get a balanced cross-SARG view.
8.	**Differences in the way specific Capability Teams & the GAU regulate:** E.g. are differences clearly defined and are associated risks known and documented? Is everyone clear of their accountabilities? All field force and ISP staff could offer views on this.
9.	**The potential for regulatory capture**: For example is there a process for systematically reviewing the risk of regulatory capture, perhaps by periodically rotating the inspectorate? Scottish aerodromes & NATS have been mentioned as potential issues so this needs exploring in the Aerodromes & ATM teams, however all Capability Teams carry this risk.
10.	**Enforcement:** Have there been instances where you or a colleague has been reluctant to take enforcement action? Is this potentially regulatory capture or were other forces at play? Is there a standardised approach to enforcement in your view? Every field force member interviewed should be asked about enforcement to get a balanced cross-SARG view, along with an enforcement SME.
11.	**Lines of communication between CAA and DfT, AAIB, MAA etc:** it was flagged that arrangements were not always formalised nor widely known across CTs. Everyone interviewed should be asked their view on this to get a balanced cross-SARG view, along with a SME who specialises in this area.
12.	**Tier 2 & Tier 3 risks that could affect or lead to a Tier 1 safety risk:** it was highlighted that these were not necessarily being flagged up / followed up. Everyone interviewed could be asked to get a balanced view.
13.	**Areas of oversight were the function is delegated, e.g. MET, OFCOM radio licensing, GAU oversight:** E.g. are all risks to exposed groups known & understood? Is this documented? Do you think these delegated authorities are effective? Is this evidenced? There are key individuals in each CT that can talk to this subject.
14.	**Changes in regulation/frameworks where an internal/external impact assessment is needed (inc. where this may not have been carried out):** There are key individuals in each CT that can talk to this subject.

Table 1.1 SARG Cross-Cut & AAA Deep Dive Themes

6.6 These themes and sub-questions were used thereafter for a series of meetings and discussions to study: (a) cross-cutting issues that affect all capability areas; and (b) a 'deep-dive' into the AAA capability area. The CAA is currently building on the trigger criteria through the development of a Regulatory Bow Tie.

6.7 The findings and observations from the fourteen themes are summarised below:

Theme 1 - Lack of financial information included in IRM process

6.8 Phase two interviews indicated that key decision makers in IRMs believe that indicative financial performance of an entity could help them make proactive decisions such as to increase or specifically target oversight.

6.9 Whilst the use of financial performance data as a lead indicator of safety performance is complex and sensitive, especially in aviation where economic cycles can swiftly and substantially affect the profitability of major carriers, it can be an important part of the intelligence picture. By using the insight of the Consumer & Markets Group (CMG), the IRM process can add valuable predictive information of an entity's ability to deliver its obligations.

6.10 Economic review does occur at present within AAA, but at an informal level. ATM has cross meetings between Economic/Consumer and Safety functions, and some links with economic regulation do exist. This could usefully be developed further.

6.11 **In summary;** further work should be undertaken to ensure that the significance of financial performance on safety is properly understood and that, where appropriate, it is used as part of the intelligence picture.

Theme 2 - Embedding of the RSMS

6.12 The RSMS seems to be embedding well. This view is supported by the following evidence:

- The Board is fully committed to the concept of the RSMS and support its development e.g. through the SLG.
- There is an established and functioning governance structure for RSMS.
- There is clear direction from the Board Chair and Accountable Manager regarding the importance of the RSMS.
- The RSMS is clearly documented including roles and responsibilities.
- There is a functioning system to identify and record new hazards through the safety risk proforma.
- There are tools and processes to support the day-to-day functions of the RSMS (Q-Pulse, Bow Ties etc.)
- Internal Review Meetings, Safety Review Panels and the Safety Review Committee function as a formalised process for evaluation and escalation of risk.

Key Points / Insights / Recommendations:

The indicative financial performance of entity (particularly when it has deteriorated) should be shared with Sector Manager and/or Oversight Managers ahead of an IRM **[REC 5]**.

Further work to understand the significance of financial performance on safety should be undertaken. **[REC 91]**

There is substantial evidence to support the view that the RSMS is embedding well.

- There is a clear Just Culture policy and its implementation has been subject to two internal reviews (in collaboration with the Irish Aviation Authority) over the last four years.
- There is a training programme for staff regarding the RSMS.
- The Board and LT have committed to establishing a safety assurance capability.

6.13 Addressing the following finding and observations may help to further embed the RSMS:

- Acknowledgement that compliance with standards is still important; the focus should not be solely on risk and SMS.
- Resource planning should be used to ensure an appropriate balance of compliance and risk-based oversight
- PBO/RBO may require additional resources particularly during the implementation phase. (This was highlighted in a report titled "A Harmonised European Approach to a Performance-Based Environment (PBE)"[3] published by EASA and CAP 1345[4].)
- The PBO Guidance does not match the RMF guidance for description of risk, which is potentially confusing.
- All staff should be encouraged to use safety risk proformas – at present they are mainly used by managers and not used widely as a hazard reporting system (compared with what may be found within operating entities).
- Safety risk proformas take time to complete which may reduce reporting. Some staff said they did not have sufficient time so they talked to their managers who then completed them.
- Some staff felt that safety risk proformas were complex and that there was no clear process for monitoring actions.
- Feedback about what was done with safety risk proformas is limited, especially in terms of the originating reporter.
- Examine whether an internal hazard reporting system should complement Q-Pulse as part of internal-facing assurance
- The usability of Q-Pulse can be improved e.g. in terms of storage of findings, audit data and historical data regarding closed findings.
- The role of Q-Pulse as a repository of corporate knowledge should be reviewed to ensure it does not hide or lose findings which may become relevant in the future e.g. as staff turnover or when new findings may reveal a recurring trend.

6.14 **In summary;** the RSMS is a valuable and effective management system which supports the CAA in exercising its regulatory functions for safety. It is embedding well, but there are a number of possible

Key Points / Insights / Recommendations:

It should be re-emphasised to all CTs that PBO should not replace compliance – it should supplement it. **[REC 6]**

The PBO Guidance does not match the RMF guidance for description of risk. This should be revised. **[REC 31]**

Future RSMS development should include focus on embedding the safety risk escalation process at all levels. **[REC 7]**

The RSMS safety risk proforma should be simplified. **[REC 8]**

Future development of the RSMS process should include implementation of a robust system for providing feedback re the identification, prioritisation & management of risks, & any resultant decisions/actions. **[REC 9]**

A review of Q-Pulse & potential system enhancements should be undertaken to mitigate the potential for loss of corporate knowledge & to enable a link to EPT **[REC 10]**

[3] A Harmonised European Approach to a Performance-Based Environment (PBE), FO.GEN.00400-003 © EASA
[4] CAP 1345 Performance Based Regulation: Business Engagement Assessment (2015)

enhancements that can take place as part of continuous improvement. The RSMS is a live system which should continue to evolve over time.

Theme 3 - Decision making process re what MORs get closed on receipt

6.15 The Safety Data Team within the SSC work closely with ISP in the management of MORs. There are sub-teams that carry out an initial review (or triage). However, no specific/definitive criteria are used to triage and/or for coding; it is based on the knowledge and judgement of the staff, who may process up to 250 a day.

6.16 In order to process such a high volume, the Safety Data Team routinely close certain (low risk) MORs on receipt. Concerns were raised during the SA Trigger Criteria workshop as to whether such decisions are reviewed periodically and whether the associated risks of these decisions are actively logged or tracked. This is important for two reasons; to ensure that longer-term trends are not being missed; and to ensure that data collected from entities is properly used (and not an unnecessary administrative burden).

6.17 The Safety Data Team categorise MORs based on the individual knowledge of each team member, rather than defined and documented criteria. Due to the high volume of reports that existed during the summer of 2016, temporary staff were used in coding and categorising MORs, which may have negatively impacted upon consistency.

6.18 One of the main issues is the sheer volume of MORs received - over 30,000 last year. A spreadsheet is produced on a daily basis and distributed to the Capability Teams. Some teams are better at collaborating with Safety Data than others – e.g. the Airworthiness CT appears to tell Safety Data a bit more about how to triage/code etc. when compared to other teams.

6.19 Quality assurance is carried out by the ISP Intelligence team, who check on the coding that is being applied. There is also an End-to-End (E2E) study underway to review the MOR process. **In conclusion of the analysis of this theme;** policy and resource to ensure appropriate quality assurance of MOR processing is particularly important, as MOR data forms a key element of the CAA's safety intelligence.

Theme 4 – Training Needs Analysis that exist in each department

6.20 There were a wide variety of disparate views about the way in which training needs were identified and analysed. If a standard process does exist across the organisation, it is not well understood. Refresher training and ongoing colleague development training is usually covered as part of the colleague appraisal process, but some departments are perceived to be better than others.

Key Points / Insights / Recommendations:

There are currently no definitive criteria for triaging/coding MORs.

There is currently no defined policy or process for determining what category of MORs are closed on receipt.

The categorisation / coding process and criteria for closing MORs should be reviewed, as necessary, after the E2E study. **[REC 11]**

The Airworthiness CT is an example of best practice with respect to providing guidance to Safety Data, and their example should be utilised by other CTs to refine & standardise the process. **[REC 12]**

A standardised TNA policy & accompanying processes should be implemented. **[REC 13]**

6.21 **In conclusion;** more rigorous Training Needs Analysis process would help to ensure consistency across the organisation. This may also help to either address perceptions that management and soft skills training is prioritised over technical training or to share the rationale for a greater focus on the former as part of the transformation process.

(Note: Appendix 2 examines competencies in greater detail.)

Theme 5 – Working outside of silo

6.22 In order to make reliable regulatory decisions, there is an increasing emphasis in a team-based approach to decision making. To facilitate this, there has been a need to try and break down a silo mentality that was known to exist between capability areas and business functions. This is a common challenge for large organisations employing a range of specialisms.

6.23 The effectiveness of breaking down silos is, as yet, inconsistent although there are an increasing number of good examples. The PBR process and elements such as the IRMs, SRP and SRC have helped to facilitate cross-disciplinary working. Individual leaders have also been successful in affecting change, but in some cases "silos may have been replaced by stovepipes". In other words this remains an ongoing challenge rather than a one-time fix-all.

6.24 Tension between some SARG staff and SSC remains following an uncomfortable period of change and quality / capacity problems. More positively, several colleagues from with SSC spoke of their enthusiasm to play a greater role in delivering the CAA's intended safety outcomes and relished the opportunity to become more connected with the capability areas.

6.25 Good examples of inter-disciplinary working include where changes are EASA or ICAO driven or where work is project based. The GAU was cited as a good example of an integrated team. Within AAA, it was suggested that the transition to 8.33 kHz channel spacing is a good example of coordination with other capability areas (e.g. Flight Ops). The Aerodromes team work closely with the ATM and Airspace teams. Aerodromes, Rescue & Fire Fighting and Operations areas also appear to work effectively together which may be partly attributable to a regional office setting.

6.26 **In conclusion;** role modelling of behaviour by the LT and middle management, empowered and supported by processes within PBO, will continue to positively influence culture and break down traditional silos. Recognising that the safety objectives of the CAA are realised by a wider team than is contained within SARG is also important.

Key Points / Insights / Recommendations:

Silos / stove-pipes remain an ongoing challenge however the PBR process has helped to facilitate cross-disciplinary working.

Tension between some SARG staff and SSC remains following an uncomfortable period of change and quality / capacity problems however there is evidence of acknowledgement & effort to address this.

The GAU is seen as a good example of an integrated team.

The Delivery Ethos & Mind At Work programmes should emphasise that role modelling of behaviour by the LT & middle management will assist in influencing culture and breaking down traditional silos. **[REC 14]**

Theme 6 – Change Management Process

6.27 Change management was perceived as one of the weaknesses of the RSMS by several interviewees during the Phase 1 interviews. This was also reflected by attendees of the workshop in Phase 2. However it was also noted by some interviewees in Phase 2 that change in SARG, in particular, is now managed by means of specific projects that include the involvement of all stakeholders. This suggests that the process is either not yet standardised, communicated or fully embedded.

6.28 A new team was recently formed at Kingsway to manage 'Business Change', which focuses on enterprise level transformation projects and/or big IT projects etc.

6.29 **In conclusion;** providing clarity regarding the differences between enterprise level business change and any 'normal' change which may impact safety, may help to improve use and perception of the change management process. Recognising that every organisation is vulnerable to 'practical drift', the change management procedures described in the RSMS Manual should be continually monitored by internal quality management / auditing processes.

Theme 7 – Resource in every area

6.30 There has been a steady reduction in headcount in recent years (SARG People Dashboard, 2016), despite acknowledgement that PBO/PBR may require additional resource at the beginning (CAP 1345[5]). This is further exacerbated by the effects of staff turnover and the challenges of recruiting and retaining suitably qualified and experienced staff.

6.31 To mitigate the effects of headcount reduction (which was largely driven by external factors), the CAA has attempted to recruit for and develop different skillsets; provide systems to support smarter working; centralise support functions through the SSC; and better schedule its field force. Not all staff have the confidence that satisfactory performance can be achieved although this is partly as a result of positions which have been budgeted for, but which have not been filled.

6.32 PBO can create additional workload both during transition and after full implementation. The timing of the transition to PBO and the CAA's transformation programme has left some confusion and apprehension that PBO is considered to be a way to do more for less. Whilst PBO carries the potential to operate differently, it is not intended as a tool for cost or headcount reduction.

Key Points / Insights / Recommendations:

Differences between the change management processes documented in the RSMS, CAA management system & COO should be removed & clarity provided regarding the relevant processes. **[REC 15]**

SARG should acknowledge the challenges introduced by headcount reduction & the potential for PBO to create additional workload. **[REC 92]**

PBO offers the opportunity to utilise resource more efficiently & is not intended as a tool for cost or headcount reduction. This should be communicated more widely. **[REC 93]**

[5] CAP 1345 Performance Based Regulation: Business Engagement Assessment (2015)

6.33 Resource planning across the organisation is not yet consistent, but this is the subject of an internal review within SARG. The complexity triangle is being used effectively to help plan resources but more importantly to identify high risk organisations and determine areas for targeted oversight.

6.34 There appeared to be many explanations for the recent MOR backlog. These ranged from internal staffing issues relating to staff turnover and speed or recruitment of replacements through to the impact of external regulatory changes (EU 376/2014 where entities are now expected to submit follow-up reports in 30 and 90 days). This highlights the importance of communicating the organisation's resourcing strategy and in allowing sufficient resilience to ensure that the CAA is able to deliver its regulatory obligations during periods of change or unexpected increase in workload

6.35 Within AAA, there was a specific issue with the split between Capability and Policy which may have led to an uneven spread of resources. There has been subject to a repeat finding from EASA regarding the lack of evidence to cover resource, EC1034/2011 (ATM / ANS Oversight).

6.36 **In summary;** headcount reduction occurring at the same time as the introduction of PBO and the challenges of recruitment and retention has introduced resource challenges. Strategic and tactical resource planning remain critical to the effectiveness of the CAA. Resource planning goes beyond 'headcount' and must consider the right skills and competencies to deal with planned and 'pop-up' activity as well as new developments.

Key Points / Insights / Recommendations:

The CAA's resourcing strategy should be communicated more widely. **[REC 94]**

Sufficient resilience must be allowed for within the CAA's resourcing strategy to enable agility in the event of pop up activity or periods of change. **[REC 95]**

Theme 8 – Differences in how Capability Teams & the GAU regulate

6.37 There are several key differences between the three main Capability Teams (AAA, Airworthiness and Flight Ops) and the GAU. Some of these stem from the sheer number of small entities that comprise the GA sector in the UK. The nature of the GA sector necessitates differences in the way it is regulated. This has led to the creation of sector-based IRMs for GA, rather than entity-based.

The nature of the GA sector necessitates differences in the way it is regulated.

6.38 Further, when considering the EU framework, most (if not all) of the rules and regulations for commercial air transport are driven by EASA and EU Commission / Parliament. Hence the UK CAA has very little opportunity to make new/additional rules and regulations applicable to commercial air transport, ATM, aerodromes or airworthiness. However the remit of GAU also includes many non-EASA aircraft and their activities.

6.39 For this reason, the GAU also interacts with some ANO-approved organisations (such as the Light Aircraft Association, British Gliding

Association) and delegates some of its oversight responsibilities. The latter is on condition that such organisations maintain their approval based on continuing compliance with ANO/BCARs.

6.40 The amount and quality of safety data that is available to the GAU is relatively limited compared to the other Capability Teams. This means that there is arguably a greater reliance on assessing sector trends and field force insight to make safety decisions. Their sector-level focus provides the opportunity to share best practice with the other Capability Teams.

6.41 **In summary;** by necessity, there are differences in how the Capability Teams regulate. There are valuable lessons to be shared amongst them, especially in terms of how sector risks are managed compared with entity risks.

Theme 9 – Potential for regulatory capture

6.42 The potential for regulatory capture is driven in part by the need and benefits of working closely with the entities or sectors that colleagues are responsible for. The need for independence of the CAA remains paramount under a PBO approach, but is arguably harder to achieve in practice. This is disproportionately true in areas where the pool of expertise is small and therefore is likely to be a close community.

6.43 Interviews with staff across Capability Teams demonstrated that the potential for regulatory capture was recognised, although no-one described a specific example of it occurring. Concerns include entities which were well known to field force staff, either because they had been responsible for them for a prolonged period or had close relationships with key individuals; entities which exerted pressure upon field force staff by virtue of their size or the seniority of their Accountable Manager; and sectors which field force staff felt a strong affinity for or were previously employed in. The FAA manage this through strict employment rules (see [6]) whereas under PBO, the CAA's approach is more nuanced depending on the maturity of the working relationship between the CAA and industry organisations[7].

6.44 **In conclusion;** there is clear acknowledgement within SARG of the potential threat posed by regulatory capture and, as such, it is largely mitigated through the regular rotation of staff and appropriate training. This is a difficult judgement call as too fast a rotation may reduce the

Key Points / Insights / Recommendations:

By its very nature, the GAU has to depend more greatly on assessment of sector trends & field force insight to make safety decisions.

The potential for regulatory capture is recognised across & at all levels of the organisation.

An independent & appropriately resourced system is required to enable colleagues to raise concerns internally. **[REC 62]**

6

http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgFinalRule.nsf/1fea64a7e354259285256aca00749e6f/169aa4ad2db34f43862578f600566143!OpenDocument

[7] CAA Internal Information Note - Maturity of Cross Organisation Relationships (MOCOR), March 2016

level of insight that field force staff develop in their entities. This approach could be further enhanced through an internal hazard reporting mechanism supported by 'Just Culture' principles which facilitates both self-reporting and whistleblowing of instances where regulatory capture seems likely.

Theme 10 – Enforcement

6.45 The CAA has a published policy on enforcement, in CAP 1018 Guidance on Consumer Enforcement and CAP 1074 Safety and Airspace Regulation Enforcement Guidance.

6.46 Some interviewees during Phase 1 (particularly senior management / Board members) suggested that SARG used enforcement action only as the very last resort. Concern was raised that this may be based on the reluctance of staff to take such action either because of the perceived workload or because they did not feel supported to do so. The Board and LT were very clear that enforcement action was a valid and appropriate tool where the analysis of safety data supported it.

6.47 Again, striking an appropriate balance is a difficult task, especially as the CAA embraces Just Culture principles. A collaborative approach to decision making based on safety intelligence allows for increased confidence in taking enforcement action. This can be further enhanced through:

- Deep-dive reviews to evaluate where enforcement action is anticipated.
- Case Study reviews by the Safety & Business Assurance team when enforcement action has been taken to understand why it became necessary and whether earlier opportunities for intervention had been missed.
- Internal sharing of lessons learned when enforcement action has been taken, especially where the circumstances were complex.

6.48 In spite of the concerns and challenges raised above, none of the colleagues that were interviewed expressed personal reluctance to undertake enforcement action.

6.49 **In conclusion;** the appropriate use of enforcement action should be monitored over time. Sharing experience within the CAA to ensure that the right balance is both understood and consistently applied will enhance the effectiveness of this mechanism.

Theme 11 – Lines of communication between CAA and DfT, AAIB, MAA, EASA

6.50 There are many points of contact between CAA and agencies such as DfT, AAIB, MAA and EASA. However, the lines of communication are

Key Points / Insights / Recommendations:

Confidence in taking enforcement action can be enhanced by:

- Deep-dive reviews;
- Case Study reviews;
- Internal sharing of lessons.

A process for monitoring the appropriate use of enforcement action should be implemented to enable monitoring over time. **[REC 96]**

Lines of communication between CAA, DfT, AAIB, MAA & EASA should be formally identified & shared across the CAA **[REC 17]**.

In some areas of SARG, liaison with the MAA is considered to be good, whereas in others improvement in the relationship should be encouraged **[REC 18]**.

not always formalised. As such, although there is a high degree of interaction, it is not always appropriately documented or well known.

6.51 The CAA interacts frequently with the MAA although the Review of RAF Northolt highlighted that there is considerable value in more frequent and formalised communication. Within AAA, the perception was that liaison with the military worked well, but that an even better relationship with the MAA should be encouraged.

6.52 Relationships with external entities have on occasions been strained in recent years. Considerable efforts have been made to rectify this situation.

6.53 Communications with DfT appear to be good within AAA, aided by the high level of interaction required as part of the Heathrow Third Runway project.

6.54 There is a very high degree of interaction with EASA at many levels of the organisations, assisted by former and seconded CAA staff. The potential effect of Brexit needs to be carefully monitored.

6.55 **In conclusion;** overall, lines of communication appear to be characterised as frequent and multi-level, but not always formalised or well known across the organisation.

Theme 12 – Tier 2 & Tier 3 risks that could affect or lead to a Tier 1 safety risk

6.56 Although the definitions of, and differences between, three tiers of risk are defined in the RSMS Manual, they are not necessarily well understood by all CAA personnel. To address this, the links between the different tiers should be more clearly emphasised. An example of this would be a reduction in resources (either Tier 2 Strategy or Tier 3 Operations risk) might lead to a Tier 1 safety risk.

6.57 Non-safety related Tier 1, Tier 2 and Tier 3 risks appear to be assessed in a different manner to Tier 1 safety risks. Whilst it is acknowledged that this may be because they are different, does this adequately address non-safety related risk that subsequently impacts upon safety risks?

6.58 As the UK's specialist aviation regulator with responsibility for safety and economic regulation, CAA faces the ongoing challenge of striking the balance between 'protection and production'. This is achieved through its governance structure including Board, Consumer Panel and the application of 'Better Regulation Principles'.

6.59 While the impact assessment process for safety regulations / policies aims to ensure that they do not impose unnecessary burdens on the

Key Points / Insights / Recommendations:

The definitions & differences between the 3 tiers of risk and the links between them should be more clearly emphasised **[REC 19]**.

Consideration should be given as to whether the different assessment method for Tier 1 non-safety compared to Tier 1 safety risks adequately addresses a situation where a non-safety related risk might subsequently impact upon a safety risk. **[REC 97]**

All commercial regulatory activities should be continually assessed for their potential impact on safety performance **[REC 20]**.

industry, all commercial regulatory activities including policy making, enforcement etc. should also be routinely assessed, as far as is reasonably practicable, for their potential impact on safety performance.

Theme 13 – Areas of oversight where the function is delegated

6.60 It is appropriate that the CAA delegates its function in areas where it is appropriate to do so. The process commenced prior to, but is entirely consistent with, the Government's Red Tape Challenge. For example, some of the GAU's oversight activities are delegated to ANO-approved organisations, which are subject to audits/inspections by CAA. Similarly, there is a proposal that the administration of radio licenses for UK registered aircraft will be transferred to OFCOM. The criteria for such delegations are clearly laid out within the ANO and the CAA will continue to have safety oversight of the process.

6.61 The Cranfield Review was unable to ascertain whether effective prioritisation of risks is taking place, where risks were overseen or monitored by delegated organisations. It was also unclear as to whether all risks, managed by such organisations, have been identified.

6.62 In keeping with CAAs commitment to RBO, all future delegations should be subject to rigorous risk assessment. A mechanism to re-visit delegations on the basis of emerging risks should also be in place for existing and future delegations.

Theme 14 – Changes in regulation/frameworks where an internal/external impact assessment needed (inc. where this may not have actually been carried out)

6.63 Impact assessment for EU regulations is carried out by EASA as part of the rulemaking process. UK CAA regularly responds to Notices of Proposed Amendments during consultation based on its own internal and external impact assessment. Impact assessment of CAA's policies where, for example, it has remit for non-EASA aircraft, is conducted by the ISP team.

6.64 CAA should also consider assessing the impact of non-safety e.g. consumer or commercial regulations. (This is linked to Theme 12, where non-safety risks can affect or give rise to Tier 1 safety risks.)

6.65 An example of the need to assess external regulatory changes for negative impact is the recent issues which emerged after EASA created new requirement for Aeronautical Information Management. This includes subjects such as objects to be surveyed near aerodromes etc. The changes did not appear to have been assessed formally, and there were limited resources or skills to deal with some of the new requirements.

Key Points / Insights / Recommendations:

It is unclear whether risks managed by delegated authority organisations have been appropriately identified & prioritised. A review should be undertaken by the S&BA team **[REC 21]**.

The CAA should consider assessing the impact of non-safety e.g. consumer or commercial regulations **[REC 20]**.

A review into the impact & available resources to manage the new Aeronautical Information Management regulations should be undertaken by the S&BA team. **[REC 22]**

6.66 **In conclusion;** despite the influence of the CAA, external changes (e.g. from EASA) may create an unnecessary burden for the industry. Acknowledging that the intent of changes is usually to increase safety, the means to implement and oversee such changes must be evaluated.

7. Objective Four: The identification and dissemination of best practice is carried out

7.1 By virtue of the CAA's ambition to be the world's leading aviation regulator, there is a great deal of activity within SARG that may be considered to be best practice in terms of safety regulation. This is widely acknowledged amongst its professional peers, although there is no room for complacency. Many of the observations made by the Cranfield Review in this regard are contained in the other Appendices. In addition, the following observations regarding the CAA's current approach to risk are made; recommendations are included which could enable improvement against the Safety Maturity Model, particularly with regards to the Elements 'Gathering & Analysing Safety Risk Data' and 'Safety Risk Information Assessment & Management'.

Risk Matrices

7.2 Within the CAA, risk is categorised and managed at three different levels – Tier 1 for risks to the Consumer and Public; Tier 2 for risks to CAA Strategies and Tier 3 for risks to CAA's business plan activities. Within Tier 1, there is a category for what are referred to as "Safety Risks".

7.3 There are currently two different risk ranking processes – one used in EPT (for IRMs), see Figure 1.2, and the other in the CAA Risk Management Framework. Both emphasise the remaining barriers, but there are major differences in presentation.

		Question 2 – Remaining Barriers What would the effectiveness of the remaining barriers between the risk/event and the most credible accident scenario be?			
		Effective	Limited	Minimal	Not Effective
Question 1 – Likely Outcome If this risk/event did escalate into an accident outcome, what would be the most credible outcome?	Catastrophic Accident	50	102	502	2500
	Major Accident	10	21	101	500
	Minor Injuries or Damage	2	4	20	100
	No Accident Outcome	1			

Figure 1.2 - Risk Assessment (Likely Outcome / Remaining Barriers) (Source: PBO Guidance Pack)

7.4 The EPT matrix is based on the Event Risk Classification (ERC) which forms part of the Airline Risk Management Solution (ARMS). As shown in Figure 1.2, this shows **Likely outcome** on one axis, with **Remaining barriers** on the other.

7.5 There is potential for mis-communication between the two formats. The CAA has advised that this issue is already being addressed, and that a common format will be used in future based on the 5 x 5 version in the RSMS (Figure 1.4). It is important to ensure that the process for the transition to the RSMS 5 x 5 matrix is robust i.e. training is given and that the impact of risks scored using the old method is not lost.

7.6 An important question is how to represent single risks. "Traditional" risk matrices have **Likelihood / Frequency** on one axis and **Consequence** on the other. This style is widely used in aviation, and is exemplified by advice given for the conduct of flying displays (CAP403 - Figure 1.3).

Key Points / Insights / Recommendations:

The transition from a 4x4 to a 5x5 ARMS matrix within EPT must include a robust migration process to ensure that corporate knowledge is not lost & that training is comprehensive **[REC 23]**.

Risk likelihood (L)	Risk severity (S)				
	Catastrophic (5)	Hazardous (4)	Major (3)	Minor (2)	Negligible (1)
Probable (5)	Unacceptable	Unacceptable	Unacceptable	Review	Acceptable
Occasional (4)	Unacceptable	Unacceptable	Review	Review	Acceptable
Remote (3)	Unacceptable	Review	Review	Acceptable	Acceptable
Extremely remote (2)	Unacceptable	Review	Review	Acceptable	Acceptable
Extremely improbable (1)	Review	Acceptable	Acceptable	Acceptable	Acceptable

Figure 1.3 - Risk Assessment Matrix from
(Source: CAP403 Appendix A - Risk Assessment - page 150)

7.7 There are two forms of Risk matrix that have been used as part of the CAA's regulatory function. For Tier 1 (non-safety), Tier 2 and Tier 3 risks, a "traditional" format using **Likelihood** on one axis and **Impact** (Consequence) on the other is utilised. This is in the same style as Figure 1.3 and may be considered to be best practice.

7.8 According to the CAA RSMS manual, Tier 1 safety risks use a different format of risk matrix. This uses **Risk Exposure** on one axis and **Control Effectiveness** on the other, (Figure 1.4). This uses language compatible with Bow Tie (Cause – Event – Outcome) representation.

Risk Exposure	Control Effectiveness				
	Very Effective 1	Effective 2	Limited 3	Minimal 4	Not Effective 5
Very High 5	5	10	15	20	25
High 4	4	8	12	16	20
Medium 3	3	6	9	12	15
Low 2	2	4	6	8	10
Very Low 1	1	2	3	4	5

Figure 1.4 –RSMS Tier 1 Safety Risk Matrix

7.9 According to the RSMS Manual and safety risk proforma, **Risk exposure** is the exposure to the event (E), due to the cause (C). According to the Scoring guidance from the CAA Risk scoring overview, the measure is based on the frequency of the event and the potential passenger and third party impact.

How **frequently** does/might the adverse event occur, due to the cause?	Score = 1 (Less than once a year) to 5 (More than once a day)
What is the potential passenger **impact** in the event of the credible outcome?	Score = 1 (Aircraft with low number pax) to 5 (Aircraft with large number of pax)
What is the potential third party **impact** in the event of the credible outcome?	Score = 1 (Little or no 3rd party impact) to 5 (large 3rd party impact)

7.10 The Safety risk proforma states that "**Exposure**" is a composite of Frequency, Passenger Impact and Third party impact. In other words, one of the scales is made up of a value comprised of two parameters. (It should be noted that no reference is made to the impact in terms of the aviation worker e.g. flight crew – see para. 7.17).

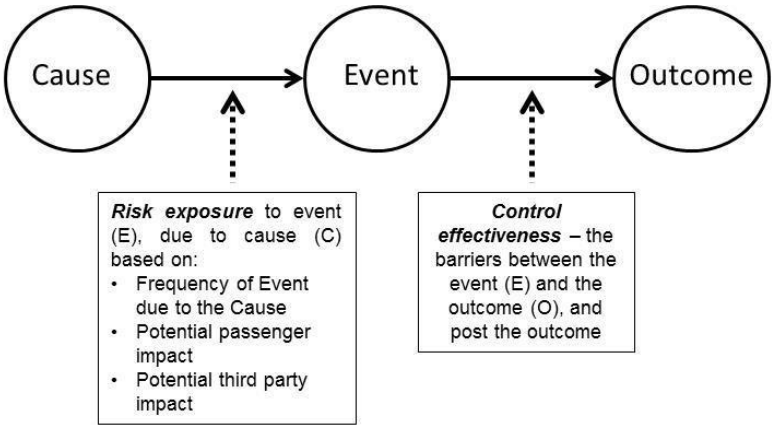

Figure 1.5 – The Cause – Event – Outcome model
Source: CAA Risk scoring overview March 17 v 2

7.11 The significance of the RSMS risk matrix is that the **Risk Exposure** on one axis is representing both frequency and consequence. From the graph, it is therefore not possible to know if high risk exposure is due to high frequency, high consequence, or both.

7.12 Since frequency and consequence are wrapped-up together in one value for **Exposure**, it is not evident whether a proposed risk control should focus on a reduction in frequency or a reduction in consequence. Also, some Tier 1 safety risks are significant but may not lead to a "credible catastrophic outcome".

7.13 It is recommended that the safety risk proforma and its accompanying guidance should be reviewed and edited to explain the scoring process more completely.

7.14 Under the current situation, entities are recommended to use one style of matrix and it is communicated that this style represents best practice; however the CAA uses a different style. It is suggested that the overall risk picture or landscape would be easier to construct if the two were similar.

7.15 If the CAA used a similar style to the entity, a more direct comparison could be made. Clearly the two assessments will differ, and indeed some risks might be omitted, but a similar technique would add value.

7.16 In summary, the style of risk matrix used may create issues, and these should be considered in the assessment of Sector risk and the construction of the overall PBR Heatmap.

Key Points / Insights / Recommendations:

The Tier 1 (RSMS) risk matrix Risk Exposure axis represents both frequency & consequence. This should be reviewed. **[REC 25]**

It is unclear how the value of Exposure on the safety risk proforma is calculated; the proforma & its accompanying guidance should be revised to explain the scoring process more clearly. **[REC 26]**

Currently, entities are encouraged to use a different risk matrix for Tier 1 safety risks; it is recommended that similar matrices should be used in future such that the overall risk picture can be more easily constructed **[REC 27]**.

For example, there should be a way of providing a means to:

- Include service data to update either the frequency of the Event or effectiveness of the Control.
- More explicitly consider and represent the controls for preventing the Event i.e. left side of a Bowtie.
- Account for circumstances when the catastrophic outcome is normally very infrequent.

Aviation worker safety

7.17 CAP 1484 describes the separation of responsibilities between the CAA and HSE by means of a Memorandum of Understanding. This covers the areas of Aerodromes, offshore operations, third party risks, Air Traffic Services, General Aviation and parachuting, Dangerous Goods and aircraft maintenance.

7.18 CAA provides comprehensive advice in CAP 757 *Occupational Health and Safety on-board Aircraft, Guidance on Good Practice*. This covers:

- Manual Handling Guidance
- Burns and Scalds
- Slips, Trips and Falls Guidance
- Falls from Aircraft Doorways by Crew Members
- Control of Biohazards in the Aircraft Environment

7.19 The impact on passenger (consumers) and impact on the public (third party) are currently considered by CAA using the safety risk proforma. Noticeably absent is "worker safety" – in other words the risk to groups such as aircraft flight and cabin crew which should also be included where the CAA has a regulatory/oversight role.

7.20 The example given on the safety risk proforma, '*Laser attack leading to pilot incapacitation'*, would certainly be a risk to the pilot, not just the passengers and third party. The issue was discussed with AAA staff, and the question posed "How does the Oversight Manager check the entity with regard to the MoU with HSE?"

7.21 The responses indicated that the separation of responsibilities was understood, and tackled through training on boundaries. The CAA is concerned with safety of aircraft only, and specifically the passengers. On the relatively rare occasions when findings were raised on HSE issues, and the HSE would be informed if these were raised.

7.22 Feedback provided during the review indicated that (certainly within AAA) staff understand the division of accountability and RSMS processes support this.

7.23 It is recommended that the responsibility for CAA oversight of Worker Safety should be addressed more explicitly throughout both RSMS and RMF. Reference should also be made on the safety risk proforma.

Key Points / Insights / Recommendations:

A review of the construction of the ISP Heatmap should be undertaken **[REC 28]**.

The CAA / HSE separation of responsibilities is clearly understood & good communication channels exist.

Worker Safety should also be considered on the safety risk proforma for risks to flight crew where the CAA has a regulatory/oversight role. **[REC 29]**

The responsibility for CAA oversight of Worker Safety should be stated much more clearly throughout both RSMS and RMF **[REC 30]**.

8. In Conclusion

8.1 The SARG Cross-Cut and AAA Deep-Dive afforded the opportunity to explore gaps and best practice within SARG. In doing so, the following four elements of safety assurance have been tested.

The basic elements of the aviation system meet at least a minimum safety standard

8.2 CAA is able to execute its regulatory function to a high degree of safety. However, there are a number of areas where further enhancements would ensure that it is able to do so in a resilient manner during times of change and uncertainty. These enhancements relate primarily to competencies and culture and are explored in more detail in Appendices 2 and 3.

There is nothing foreseeable that is likely to cause an accident

8.3 CAA adoption of a PBO approach increasingly allows it to use an intelligence-based approach. This is founded on 'safety data collection, analysis and exchange' and is increasingly allowing it to move to the next stage of maturity – 'data-driven targeting of oversight of areas of greater concern or need'.

8.4 Existing systems appear to function well as a new way of thinking becomes the norm. Whilst success can only ultimately be measured with hindsight, the structure and mindset to ensure that reasonably foreseeable threats are identified and managed is becoming increasingly mature.

8.5 Targets for, and measures of, improvement are considered in further detail in Appendix 4 using a new 'CAA Safety Maturity Model'.

The outputs of the CAA that matter to safety are correct and effective

8.6 Critical self-reflection is an essential element of safety assurance. To be able to do this effectively also requires process and mindset, led by the Board and LT.

8.7 In order to further develop this mindset, a set of trigger criteria were developed with the CAA to identify areas which may be deficient or vulnerable. The trigger questions have also been used as part of a Safety & Business Assurance team project to develop a 'Regulatory Bow Tie'. It is envisaged that this and the other safety assurance tools (Safety Maturity Model, Case Studies Methodology), coupled with appropriate resourcing of the safety assurance function, will further enable self-reflection.

8.8 Findings and observations were made across SARG and used to inform the CAA Safety Maturity Model. It is recommended that these findings and the associated recommendations are now used by the CAA to develop a programme to enable improvement against the framework of the Safety Maturity Model.

The identification and dissemination of best practice is carried out

8.9 The CAA's adoption of best practice is characterised by its commitment to a RSMS, adoption of PBO principles and approach to risk. There are opportunities to share best practice further – internally and externally as its cultural maturity increases. This concept is further discussed in other Appendices.

Appendix OOR01
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Appendix 2
Competencies Review

1. Background:

1.1 In July 2016, Cranfield University was commissioned to undertake a review of SARG. The primary objective was to highlight best practice versus safety assurance challenges.

1.2 As part of Phase 2 of this Safety Assurance Review, Cranfield was asked to undertake a review of safety assurance related competencies in the CAA and to suggest what the next steps may be in terms of competence development.

1.3 Interviews were conducted with individuals involved directly in the development of competencies in the CAA, and with members of the current HR team. Each interviewee was given an opportunity to share their experiences and describe some of the current issues / needs and challenges / opportunities, as they saw them, in relation to competencies.

1.4 The interviews were supplemented with a review of relevant CAA documents (see References, page 11).

2. The SARG inspectorate role specific competency framework[2]

2.1 Initial efforts to develop PBO specific competencies began in 2012. The original competencies framework was benchmarked with ICAO and the development team engaged with EASA and other stakeholders. A two-day course was developed and was delivered to people across all capability areas.

2.2 The latest version of the competency work is outlined in the document titled: *SARG inspectorate role specific competency framework*[2] (sometimes referred to as the PBO competencies). This document outlines the inspectorate role specific competencies and their definitions. These competencies apply to staff within SARG Capability Teams, and those within the Shared Service Centre (SSC) who are involved in oversight functions.

2.3 The framework has nine competencies as detailed below:

Competence	Descriptor
Systems, Tools & Processes (Performance Based Regulation)	Supports the application of Performance Based Oversight and the systems, tools and process knowledge to situations that help manage risk and improve regulatory performance.
Enforcement	Initiate & effectively support any level of the enforcement process when there is a breach of a regulatory requirement or concern for aviation safety.
New Technologies & Changing Operational Environment	Demonstrates flexibility and adaptability to new and emerging technologies, ideas and processes both internally and externally. Encourages the sharing of information and best practice to enhance the collective knowledge within the CAA.
Change Management	The ability to operate effectively within a change environment to deliver results.
Commercial & Financial Awareness	Understands the commercial and financial pressures placed upon those we regulate in order to effectively influence the desired safety outcome.
Applying Regulations	To ensure the aviation industry maintains its confidence in the regulatory environment and to influence safety improvements across the aviation system.
Data & Information Management	Capability to understand and analyse complex issues, drawing on the breadth of data and information available.
Project Management	Manages the scope of work and / or projects including complex and competing priorities, meeting deadlines and delivering agreed benefits.
Working in a Matrix	Working collaboratively across the capability teams and wider CAA to ensure we get the best outcome.

2.4 Each of these nine competencies is further divided into either a three or four tier matrix that indicates increasing competency. This system is intended to enable the competencies to be applied to each individual's specific role:

Four tier

- Tier 1 – Operations Support Officer (OSO) and Technical Support officer (TSO)
- Tier 2 – Inspecting Officer (IO)
- Tier 3 – Inspector and Surveyor
- Tier 4 – Manager and Principal Airworthiness Surveyor

Three tier

- Tier 1- Operations Support Officer (OSO), Technical Support officer (TSO) or Inspecting Officer (IO)
- Tier 2 - Inspector and Surveyor
- Tier 3 – Manager and Principal Airworthiness Surveyor

Thus, where a competency is listed with four tiers, an Inspector would be expected to meet the performance indicated by Tier 3; for competencies with three tiers, Tier 2 competency would be expected.

2.5 Interviewees suggest that the SARG inspectorate role-specific competency framework[2] has been used to provide greater clarity around what is expected of staff in relation to PBO, and to help people maximize their performance in their oversight role. However, some colleagues indicated that the use of both three and four tier formats within one competency framework could be confusing.

2.6 PBR requires the professionals working within regulatory authorities to possess additional social and management skills. Cranfield saw no evidence that the development needs of frontline staff have been identified and addressed systematically in recent years. No learning needs analysis was supplied.

2.7 There is little evidence that the SARG inspectorate role-specific competency framework[2] is currently used effectively for recruitment, performance management and reward, and development discussions. The HR team should address this.

2.8 The SARG inspectorate role-specific competency framework[2] now sits under the responsibility of the HR team, which has the potential to help align this competency framework with other training provisions. Whilst HR own the process of managing the inspectorate role-specific competency framework, it should not be seen a purely an HR responsibility and may be delivered via several different means.

Key Points / Insights / Recommendations:

The SARG inspectorate role-specific competency framework provides greater clarity in relation to PBO.

The use of both three and four tier formats within one competency framework can be confusing to colleagues.

The development needs of frontline staff do not appear to have been identified & addressed systematically.

The HR team should ensure that the SARG inspectorate role-specific competency framework is used for recruitment, performance management and reward, and development discussions **[REC 33]**.

2.9 To ensure relevance and effective use of the competency framework in the future, it is recommended that the PBR team periodically monitor, review and update the SARG inspectorate role specific competency framework[2].

3. CAA's core competency framework

3.1 From 1st April 2017, a new core competency framework took effect in the CAA, which involved the development of the senior leadership knowledge, skills and attitudes.

3.2 Interviewees note that the new framework will not only be used to raise competency standards for new recruits and internal promotions but it will, over time, create thresholds and raise the overall level of competencies in the CAA.

3.3 With the competencies broken down into tiers of seniority, interviewees suggest that it will assist in navigating career moves - i.e. the competencies need to be attained to move from being a mid-manager to senior leader.

3.4 Interviewees were unable to explain the relationship between the core competency framework and the SARG inspectorate role-specific competency framework[2]. The HR team should address this when considering development needs of employees who contribute to inspectorate / oversight functions.

3.5 CAA competence frameworks do not appear to be fully aligned with job descriptions. There seems to be some confusion about the different competency profiles that exist. As many as 5 different frameworks were mentioned during interviews. It is recommended that the HR team conduct a review of competency profiles.

3.6 Some interviewees suggested that a Leadership Competence Framework is being developed aligned with 360s and coaching for the top two tiers. However, this information was not available to review and a large number of other interviewees were unaware of its existence.

3.7 Corporate values work has been undertaken within the CAA but it does not appear to underpin training and development. However, it is used to underpin the recognition and reward scheme (see below).

Key Points / Insights / Recommendations:

HR should ensure that colleagues who contribute to oversight functions understand the relationship between the core competency framework & the SARG inspectorate role-specific competency framework **[REC 35]**.

It is recommended that HR team conduct a review of competency profiles **[REC 36]**.

A review of competency profiles should include analysis of the viability of maintaining parallel frameworks **[REC 37]**.

The existence of the new Leadership Competence Framework is not widely known.

Corporate values do not appear to underpin training & development.

4. Recognition & reward and competencies

4.1 The CAA is committed to providing a work environment that promotes, recognises and rewards performance. The organisation aims to create a climate for performance excellence at every level for individual performance.

4.2 It is the responsibility of line managers and other staff to ensure that recognition rewards are awarded to staff who clearly and consistently exceed expectations.

4.3 The reward system is aligned to core values. A record of the recognition points awarded to CAA colleagues in the 16/17 financial year reveals that rewards were given as follows[8]:

- Collaboration (n=216)
- Learning (n=43)
- Respect (n = 8)
- Energy (n=252)
- Clarity (n-37)
- Integrity (n=23)

4.4 Rewards are closely aligned to and organised around these six core values (above). Although safety is clearly a key strategic imperative and an important cultural item in the CAA, it is not explicitly listed amongst these six core values. Whilst CAA staff can use the reward system for recognising colleagues for safety-related performance, it must be categorised under one of the six values. Thus, it is currently not possible to ascertain from the recognition reward statistics which, if any, of the rewards allocated under this system are related to safety.

4.5 There is a very clear link between the recognition system and values. However, the relationship between the recognition system and competencies in the CAA is unclear. Therefore, it is not clear how behaviours and performance related to the SARG inspectorate role specific competency framework (see section 2) are recognised formally in the CAA.

Key Points / Insights / Recommendations:

It is not currently possible to ascertain how safety related performance is being formally recognised by means of the CAA rewards system.

It is not clear how the behaviours related to the competency framework are recognised formally in the CAA.

It is recommended that the CAA identifies a means of categorising and/or analysing the rewards statistics to ascertain how safety is being recognised formally. This data should be reviewed periodically by the S&BA team. **[REC 98]**

5. Existing training provision relevant to safety assurance

5.1 **PBR Induction Training[1]:** This programme is used to train new field force staff. This takes the form of a two-hour session on Performance Based Regulation / Oversight (PBR / PBO) & the Regulatory Safety Management System (RSMS). The induction session is followed with a session on the Entity Performance Tool (EPT) and practical implementation of the Customer Relationship Management system (CRM).

All new CAA staff are booked on this training shortly after joining. The induction is an effective training intervention for introducing PBR but is insufficient to fully develop field force staff for a PBO environment.

5.2 **F5 'Fit for Future Field Force' training sessions:** This programme was developed at the start of the PBR programme and focused on soft skills development; it was delivered by an external provider. Interviewees noted that the programme 'did not land well' with all participants - many felt that they 'were doing PBO anyway'.

It is widely acknowledged that the F5 programme was delivered at a time when people started to react to the change to PBR and interviewees stated that participants used the sessions to express their concern, anger, resentment and fear. The F5 programme ended in spring 2017.

The move to PBO requires a broadening of skills across technical and non-technical, but not all colleagues accept the need to develop non-technical skills or are comfortable in using them.

5.3 **Talent Development Programme[3]:** A broad portfolio of initiatives for learning and development exist within the CAA. A series of diagnostics carried out during 2012-2014 focused on non-technical development to initially address the following key areas to:

- Develop transformational leadership capability for strategy formulation and successful implementation.
- Strengthen the corporate succession pipeline.
- Create a diversity of emerging talent.
- Drive up general people skills amongst the managerial population.
- Create development tools to identify and monitor personal development to assist in the search and selection of internal promotions and acquisition of talent.

As a result, the Talent Development Programme[3] and Senior Manager Programme[4] were developed. These development opportunities complement PBO by focusing on the development of the knowledge, skills and attitudes required by PBR but are not currently aligned directly with the PBO competencies[2].

Key Points / Insights / Recommendations:

Induction training is an effective means to introduce PBR.

Induction training is insufficient to fully develop field force staff for a PBO environment.

It is acknowledged that F5 training did not land well with all participants.

Not all colleagues accept the need to develop non-technical skills or are comfortable in using them.

A broad portfolio of initiatives for learning & development exist.

There is little evidence of an ongoing analysis of performance/potential and a systematic talent management process.

5.4. **Senior Manager Programme**[4]**:** This programme aims to develop leaders within the CAA who can lead their teams and the organisation effectively through outstanding performance development and management, collaborative and partnership approaches. In addition, to develop leadership capability to create and deliver innovative solutions and who are committed to an organisation delivering service excellence to customers, consumers and stakeholders. Specifically[6]:

Self	Others	Organisation
Take radical ownership for their state and be able to shift it. Expand capacity to take ownership and accountability. Become willing and effective problem-solvers.	Be people developers who mentor and coach through guidance, accountability and timely feedback. Build relationships through partnership and collaboration. Engage in problem-solving and collaboration.	Realise strategy by innovative solutions to keep the organisation relevant and effective. Be leaders who uphold an ethos of service whether directed towards external customers, internal colleagues or those being protected. Upholders of standards and excellence.

5.5 It should be noted that the engagement survey suggests that employee rating of training and development has improved over recent years.

Key Points / Insights / Recommendations:

The Talent Development Programme & Senior Manager Programme complements PBO principles.

The Talent Development & Senior Manager Programmes are not currently aligned with the PBO competencies.

There is little evidence of an ongoing analysis of performance / potential and a systematic talent management process.

A systematic talent management process should be implemented as a matter of priority **[REC 38]**.

Engagement survey statistics indicate an improvement in training & development over recent years.

6. Future field force and PBO development provision

6.1 Future development provision should acknowledge that the CAA is on a journey to develop field force staff and embed PBO with three stages:

1) Letting go of the old mindsets and routines.
2) Learning sustaining change through a period of uncertainty, confusion, ambiguity, exploration, experimentation and trial and error while the new approach is developed.
3) The emergence and consolidation of the new mindset and adoption of latest work practices.

6.2 The F5 training, despite the difficulties described in paragraph 5.2, aimed to help CAA staff navigate the first two phases. Future development provision should focus on the third, thereby helping to develop field force staff and make PBO pervasive across the CAA.

6.3 It is recommended that a specific PBO development programme is designed to fill this critical gap in provision. The programme would focus on field force and employees involved in inspectorate / oversight functions. The development programme would help:

- Embed PBO changes made.
- Encourage PBR to grow and develop.
- Enhance the involvement engagement of appropriate staff in PBR.

6.4 The development provision would aim to reinforce the following PBO principles[1]:

- Gathering and analysing safety risk data.
- Agreeing the actions that are needed.
- Safety risk information.
- Informed decisions to deliver safety outcomes.
- Resources proportionately to safety outcomes required.

6.5 The technical knowledge and experience of both CAA's management staff and frontline inspectors and surveyors has been recognised as one of its strengths and acknowledged by the industry. However, some interviewees perceived that there had been some loss of technical expertise across the CAA in recent years. Interview and documentary evidence did indicate that slow or unsuccessful recruitment had left some areas understaffed against their budgeted profile (e.g. Flight Operations, SSC). In addition, areas where staff turnover is high has resulted in a loss of efficiency due to constantly changing networks – in simple terms, knowing who to speak to about a particular issue. These factors may have contributed to the perception of a loss of technical expertise.

Key Points / Insights / Recommendations:

Future development of F5 training should focus on the emergence & consolidation of the new mindset & adoption of latest work practices **[REC 39]**.

It is recommended that a specific PBO development programme be implemented **[REC 40]**.

The technical knowledge & experience of CAA colleagues has been recognised as one of its strengths.

Some interviewees perceived that there had been a loss of technical expertise across the CAA in recent years.

The majority of interviewees noted that existing opportunities to develop technical skills are available in the CAA, and technical skill is adequate to perform effective PBO. Therefore, future development provision should focus on 'soft' (non-technical) knowledge, skills and attitudes that are required for field force staff to operate in a PBO environment.

6.6 The development programme should focus on the challenges faced by staff moving from roles based largely on technical expertise to ones that are less concrete and defined and that require discretion, agility, reliance, empathy and courage. This is neither an easy nor comfortable journey of personal growth and change, as the 'black vs. white' rationale and logic that CAA staff have in the past been able to rely on is replaced by what is perceived by many interviewees as the 'greyness' of regulation in the new era.

6.7 The development programme should also acknowledge that the field force is taking on bigger (and broader) roles and responsibilities. This challenge is further compounded by the rapidly changing landscapes in which they are operating. This evolution both requires and develops resilience, trust, mental and emotional agility and the capacity to see the local detail and the big picture.

6.8 Development provision should focus on a different set of 'soft' (non-technical) knowledge, skills and attitudes that are required for staff to operate in a PBO environment. These include[7]:

- Performance-based orientation / mindset.
- Dealing with complexity.
- Self-development.
- Interpersonal skills.
- Communication.
- Analytical thinking.
- Oversight and project management.
- Decision-making and responsibility.
- Teamwork, collaboration and partnership.

6.9 The development of these competencies requires learning and development rather than teaching and training. Implicit in this is the understanding that development cannot be achieved simply by acquiring intellectual / conceptual knowledge about PBO. It has to be lived, directly and consciously, while being coached and guided so that the experience can be understood and integrated into the formation of a new mindset and behaviours.

6.10 So PBO capability cannot be taught - but can be learned. Such a development journey does not unfold in a simple linear predictable process. It has an organic, non-linear, unpredictable dynamic to it.

Key Points / Insights / Recommendations:

The majority of interviewees acknowledged that technical skills & the opportunity to develop these were currently adequate to perform PBO.

Bigger & broader field force roles & responsibilities require and develop resilience, trust, mental & emotional agility and the capacity to see local detail & the big picture.

Cranfield recommend focus on soft skill PBO competencies, as outlined in para 6.9 **[REC 41]**.

The development of soft skill PBO competencies requires learning & development rather than teaching & training.

During any future development programme it will be important to adapt and respond to the issues faced by participants as they unfold.

This means that, in terms of design, it is possible to identify the general direction of travel and the type of topics to explore, and the method of exploration. However, in the end, it is important to adapt and respond to the issues faced by participants as they unfold. This, itself, is also instructive for the participants because it happens to mirror the PBO environment and the complexity of the regulated entities.

6.11 At the heart of an effective development approach needs to be stimulation of latest thinking, and the use of learning methods that are experiential and interactive to explore PBO. We recommend that inputs are directly related to the CAA and challenge the participants to do likewise. We highly recommend that the CAA identifies strategic level, business critical issues and themes for participants to explore. Their very nature must embody ambiguity, contradiction, dilemma and complexity to reflect the need for PBO.

6.12 We also recommend that the ExCo and Board create a context within which participants can transform by supporting and by being directly involved in the programme.

6.13 Suggested Key Features of a future PBO development programme:

- A launch webinar which would set the scene for the new PBO Programme in terms of the rationale, desired outcomes, structure, content, style and introductions of CAA senior sponsors.
- 360 feedback (at the start and finish) would help to reduce participant's 'blind spots' and enable them to be more effective in their roles.
- Face-to-face modules covering key competencies for PBO. The modules would provide stimulating latest thinking, and then use learning methods which would be experiential and interactive to explore PBO, always ensuring that inputs were related to CAA challenges and inviting the participants to do likewise.
- 1-2-1 coaching would help participants make sense of the content of the modules and assess the relevance to their own purpose and team / unit and deepen their understanding and address their own key challenges and development.
- Collaborative Learning Groups (CLGs) in which participants work on a 'PBO project', that would be a priority challenge for CAA. This powerful approach has been proven to enable participants to engage in reflective practice and share thinking, and would provide a mechanism for field force staff to play an active role in taking PBO to the next level. These 'projects' work particularly well when they are decided upon and assigned by the Board and each one has a Board Sponsor / Mentor. This would help the group frame the terms

Key Points / Insights / Recommendations:

It is recommended that the CAA identifies strategic level, business critical issues and themes for PBO training participants to explore **[REC 42]**.

It is recommended that the ExCo and Board create a context within which PBO training participants can transform by supporting and by being directly involved in the programme **[REC 43]**.

Key features of a future PBO development programme are proposed in para 6.14.

of reference and desired outcomes for their 'project' and then be present throughout the programme at set times during the modules to continue (in an appropriate way) to guide and support the group and demonstrate their understanding of and commitment to it.

- A closing event which would symbolically mark the end of the PBO programme and during which the Collaborative Learning Groups (CLGs) would present both the recommendations and learning from their 'projects'.

References

1 **Performance Based Regulation New Starter Training slides.**
2 **SARG inspectorate role specific competency framework.**
3 **Annual Talent Development Programme Update from Oct 2016.**
4 **Senior Manager Programme - overview.**
5 **CAA Mentoring Scheme Information Pack.**
6 **CAA Leadership Competency Framework.**
7 **EASA MB 2016-02, Cologne, 12 and 13 December 2016, WP15: Inspector Competencies WG Report.**
8 **CAA recognition awards 2016/17.**

Appendix 3
Culture and Safety Assurance

Executive Summary

1.1 In July 2016, Cranfield University was commissioned to undertake a review of SARG. The primary objective was to highlight best practice versus safety assurance challenges. Additionally, Cranfield was requested to propose a methodology for safety assurance activities that could be embedded as an ongoing function.

1.2 During phase one of the Cranfield Safety Assurance Review, the role of culture was shown to be of critical importance, both in terms of perceived and real gaps in safety assurance capability and in terms of the enablers that need to be in place for future development.

1.3 This appendix describes the observations of the Cranfield team about the status of the organisational culture and climate. A number of cultural challenges have been identified, which the CAA should address – these are documented in paragraph 3.

The Importance of Culture to Safety Assurance

2. The ultimate enabler of change

2.1 The UK Civil Aviation Authority is highly regarded around the world based on a long history of leadership, expertise and integrity. However, a great deal of change has occurred including the formation of the European Aviation Safety Agency (EASA) and subsequent movement of some regulatory responsibilities to Cologne; changes at government level in respect of regulatory principles and the burden that is placed upon industry; changing in funding; and a fundamental change in the way that the aviation industry manages safety.

2.2 As the statutory aviation regulator, tasked with protection of the public, the CAA cannot allow its record to slip – indeed **its challenge is to improve on it where possible**. The world in which it executes its function is changing quickly – the technology, business models and consumer expectations have changed and so too has thinking around the best regulatory models[1].

2.3 By developing a Regulatory Safety Management System (RSMS), the CAA has adopted best practice from the SMS concept whilst acknowledging that their role is fundamentally different to that of an entity. A key similarity is that both are concerned with creating **a consistent, common management system to allow the organisation to deliver the right safety outcomes**.

2.4 Pivotal to the success of any SMS is **senior management commitment and how this translates into the day-to-day activity**. It is for this reason that organisational culture – and its subsets such as safety culture and Just Culture – plays such an important part. This is very clearly articulated within the RSMS – for example, section 5.1 of the RSMS Manual (version 3.0) states:

"Internally, we strive for an empowered, learning and improving culture and to achieve this staff at any seniority level must feel able to responsibly and professionally question decisions and processes and, where appropriate, to report concerns without fear of detriment."

2.5 Building the structure for an SMS is challenging enough for many organisations. Delivering the requisite cultural change can be rather more difficult. Taking a 'standard format' SMS and tailoring it to an organisation can be a fast route to delivering processes and procedures, but the **cultural transformation is unique to a particular organisation** based on its starting point, the commitment of its leadership team, the willingness of its workforce to embrace change and a range of other factors. The challenge is even greater for an organisation such as the CAA which has an excellent reputation to uphold and a great deal of externally-induced change to respond to.

2.6 The ICAO Safety Management Manual[2] states "Culture is characterized by the beliefs, values, biases and the resultant behaviour that are shared by members of a society,

[1] Dame Deirdre Hutton, Chair of the CAA Board, Civil Aviation Authority Regulatory Safety Management System Manual, Version 3.0, October 2015.

[2] ICAO (2013) Safety Management Manual. Third Edition.

group or organization. **An understanding of these cultural components, and the interaction between them, is important to safety management**."

2.7 Since it was first used as a term by the nuclear sector in the late 1980s following the Chernobyl disaster, 'safety culture' has become increasingly popular. However, some question the apparent separation from organisational culture that has started to occur. **Many organisational factors influence safety performance, often in ways that are not immediately apparent or obvious.**

2.8 In the context of the CAA, **the safety outcomes it aims to achieve are not solely influenced by the performance of SARG**. They are affected, through the Board and Leadership Team, by the full range of activities and business functions. As such, the importance of culture to achieving its regulatory objectives goes beyond either Just Culture or safety culture

3. Measuring the CAA's culture

3.1 **Assessing culture is notoriously difficult**. Whilst tools abound to measure organisational culture and specific elements such as safety culture and Just Culture, they are only as good as the sample they analyse, the elements they test or how the results are interpreted. This does not denigrate their value, but rather places increased responsibility on those in a position of leadership to use information about culture carefully and responsibly. **There is no perfect culture** and even high-performing cultures are often achieved through different elements of strength.

3.2 **Major changes in organisational culture can take 5-10 years to take effect**. Attempts to measure culture take many forms ranging from surveys to observational ethnography[3]. Many capture 'climate' rather than culture as they capture a moment in time rather than the more enduring culture.

3.3 Whilst culture can be used to characterise the personality of an organisation, it is open to many interpretations and perspectives. There will be exceptions to any description of a culture and short-term variation is natural – hence description of a moment in time as 'climate'.

3.4 The CAA is engaged in a major transformation programme which has included significant structural and staffing changes. It has also been through a period during which it has set itself an ambitious target of becoming the world's leading performance based regulator and had to deal with a series of 'pop-up' events including a series of fatal accidents.

3.5 The influence of these changes and events is reflected in individual beliefs, values, biases and behaviours. For example, the climate changed rapidly in response to recent accidents, but in different ways across the organisation. Some changes will have been short-term whereas others have become embedded into an evolving culture.

[3] See Reeves, S., Kuper, A and D Hodges (2008) Qualitative research methodologies: ethnography, BMJ 2008; 337:a1020 http://www.bmj.com/content/337/bmj.a1020

3.6 **The CAA currently measures its culture in a variety of ways** including the Employee Engagement Survey, Safety Culture Survey and Just Culture Assessment. In addition, there are many indicators of culture that range from turnover statistics and information regarding employee reasons for leaving to observable behaviours and artefacts. External perspectives (e.g. from this Review), or those of 'fresh eyes' - new employees - can provide additional insight. **The remaining challenge is how to assess what 'good' looks like at a particular moment in time**.

3.7 The Safety Maturity Model detailed in Appendix 5 provides another tool by which the CAA's own cultural journey can be assessed. It is based on established maturity models and tailored for the CAA's ambitious journey to become the world's leading performance based aviation safety regulator. **It is designed to help both measure and manage** by providing a broad range of qualitative statements by which to assess progress and set development targets.

3.8 To assist with creating a baseline, the Cranfield Review has undertaken a cross-cut of SARG and deep-dive of AAA (Appendix 1), competencies review (Appendix 2) and has also identified specific cultural challenges and opportunities which are detailed below, along with an indication of progress that is being made to address them.

4. Cultural Challenges and Opportunities:

4.1 **A wide range of perceptions exist** across the organisation, some of which are based on 'myths and legends' about how the CAA used to operate and behave. The term 'safety assurance review' still carries negativity amongst some of the staff based on the way in which the 2014 internal review was conducted, reported and responded to. Whilst there are differing views on what happened, the current review was commissioned and executed in such a way as to demonstrate a different approach. Confidentiality of participants was guaranteed; the review team were given open access to all levels of the organisation; a communications plan was agreed and the team were given the opportunity to brief the Leadership Team, Chief Executive Officer and Board in an open way.

4.2 There has been a clear attempt on the part of the LT to move on from the 2014 Safety Assurance Review and embrace a different approach. The way in which the Cranfield Safety Assurance Review is communicated and responded to will be carefully observed by many as an **indicator of cultural change**.

4.3 The review team encountered **significant anxiety from many participants** during interviews, and several CAA employees declined the opportunity to participate in the Review. In some cases previous bad experience, involving them or their colleagues, had led interviewees to feel concerned that comments may be attributable to specific individuals and that they may suffer

Challenges that the CAA should acknowledge and address:

Certain myths and legends remain about the 2014 Safety Assurance Review which must be addressed through the response to the Cranfield Review **[REC 44]**.

negative consequences as a result. This cannot be ignored. Whilst a sense of 'chronic unease' may be encouraged in an organisation which is involved in safety critical endeavours as a way of maintaining vigilance, this was different. Chronic unease, in safety culture terms, refers to a healthy scepticism about one's own decisions and the risks that are inherent in work environments. However, this Review found some staff in the CAA are **uneasy about questioning established ways of approaching problems and raising concerns**. This is detrimental to safety culture.

4.4 When probed, some interviewees also perceived that senior managers do not listen to their concerns and that change rarely happens as a result. This finding is supported by the recent engagement survey that found that **staff with longer tenure in the CAA are less likely to raise concerns**.

4.5 Many individuals do not believe that the CAA culture enables them to make and report mistakes. There is a perception that the result may be punishment not an opportunity for learning. As such, when things go wrong, **some people are reluctant to share their experiences and insight for fear of consequence** – something that may be expected of a 'pathological' or 'reactive'[4] organisation. This goes against the CAA's determined efforts to develop a Just Culture, which suggests that many people are still in the early stages of the transition. It is hard to fast track such a transformation except through acts and deeds, although there is evidence of improvement.

4.6 **An organisation of experts needs to become an expert organisation**. Whilst the CAA's staff remain critical to its success, it is how the CAA acquires, shares, uses and retains its expertise that will determine whether or not it is able to achieve its objectives. For some colleagues, this presents a major shift from the organisation they joined where expertise tended to lie with specific individuals based on their operational experience.

4.7 **Decision making is necessarily becoming more collaborative**, not simply because the expertise is shared, but also because a range of perspectives allows decisions to be challenged and tested. This is a transition that occurred on the flight decks of commercial aircraft over recent decades, but one that challenges a legacy culture in the CAA where the 'expert is king'.

Challenges that the CAA should acknowledge and address:

'Chronic unease' can be a positive characteristic but is different from anxiety about providing feedback, which is detrimental to safety culture.

The significant anxiety of many participants in the Review including concerns that that they may suffer negative consequences as a result of taking part cannot be ignored.

Some people are reluctant to share their experiences & insight for fear of consequence.

[4] Safety Management and Safety Culture The Long, Hard and Winding Road. *Hudson, P* http://www.caa.lv/upload/userfiles/files/SMS/Read%20first%20quick%20overview/Hudson%20Long%20Hard%20Winding%20Road.pdf

4.8 **It is practically impossible for CAA to employ experts in all of the areas it has responsibility for,** despite societal expectations to the contrary. It cannot always compete with industry to attract and retain suitably qualified and experienced staff, especially in areas that are fast developing such as advanced technologies and materials or where experience is diminishing such as legacy technology or equipment.

4.9 **The CAA must work intelligently to build and retain its knowledge-base as an organisation** as well as a supporting network of peers and support organisations, and appropriate relationships with regulated entities. This may also include delegating authority to appropriate bodies for some tasks, as has started to occur within Flight Operations.

4.10 **The full implementation of Performance Based Regulation may, in time, create the opportunity to do more with less.** In other words, by taking a more intelligence-led, risk-based approach to regulation, the CAA may be better positioned to achieve its organisational objectives with a reduced regulator burden and therefore cost. However, the journey from traditional compliance-based regulation to PBR requires investment in building the processes, tools and, perhaps most importantly, mindset in order to work more effectively. In some cases, this has created additional workload.

4.11 As in most organisations, **many subordinates think their management think differently than they actually do.** Conversely, many of the management team think their subordinates think differently than they do. Many acknowledge the positive and proactive approach taken by the current Board, Chief Executive and Leadership Team to communicate with the organisation, although some felt that there was an opportunity for even more engagement. Where 'myths and legends' do exist, the words of management need to be amplified through their actions in order to reinforce the behaviours expected of everyone and to drive cultural change.

4.12 The CAA has gone through a period of significant change, which some have found to be difficult. Where colleagues have decided to leave the organisation there is the **risk of an inevitable loss of corporate memory**, partly because of a mode of operating where decision making was poorly documented and expertise lay with individuals rather than the organisation itself. Developing a culture whereby decision making is evidenced and documented and single points of failure are identified through a proactive approach to assurance is part of becoming a learning organisation.

Challenges that the CAA should acknowledge and address:

To retain its knowledge-base in an environment where it is difficult to employ & retain experts in all areas, the CAA must work intelligently and may need to delegate authority to appropriate bodies for some tasks.

There is disconnect between colleagues & their management in terms of what each party believes the other party thinks.

To become a learning organisation, the CAA will need to develop a culture whereby decision making is evidenced & documented, and single points of failure are identified.

Sharing enthusiasm for change is an important aspect of embedding that change.

The Delivery Ethos & Mind At Work programmes already in-flight should emphasise that the words of management need to be amplified through their actions in order to reinforce the behaviours expected of everyone and to drive cultural change. **[REC 89]**

4.13 Some colleagues felt more comfortable with the way that the CAA used to operate, although over time there is an increasing recognition that many factors have changed to make this impossible. Others have had bad experiences during the transformation and are therefore at different points of the transition curve. However, **there are also many colleagues who are embracing the new environment and who are enthusiastic about it.** Sharing their enthusiasm and passion is an important aspect of embedding the change, especially as many people are naturally fearful of change.

The Cultural Transformation

5. <u>Progress to Date:</u>

5.1 There is a **high degree of recognition amongst the Leadership Team that cultural change is a fundamental and necessary element of the transformation programme**. A range of activities have been undertaken to support the change process including engaging Mind at Work to help develop the ExCo and senior management population mindset around five key capabilities (collaboration, innovation, engagement, flexibility and accountability), and the development of the F5 Field Force Fit for the Future intervention (see Appendix 2: Competencies).

5.2 Initially, **the leadership team have been more willing to embrace the cultural transformation than some of the front line staff**. This has been particularly the case where softer-skills training has been directed at more technically-minded experts. The F5 programme, for example, elicited some strong negative reactions which is perhaps an indicator that certain people felt very uncomfortable with what was now being expected of them and perhaps resistant to change. CAA staff have gone through each stage of the transition curve at their own pace. For example, those who were comfortable with the change moved ahead quickly, while others lingered in a phase of fear, denial, frustration and scepticism / resentment (as defined on the Kubler-Ross Change Curve) towards the change initiative. The main strength of the Transition Model, created by change consultant William Bridges and published in his 1991 book "Managing Transitions", was the difference between transition and change. The distinction is subtle but important. Change is something that happens to people, even if they don't agree with it. Transition, on the other hand, is internal: it's what happens in people's minds as they go through change. Interviewees note that the focus within the CAA has typically been on change and greater attention could be focused on helping people make the transition to new ways of working.

5.3 **Structural change has resulted in some roles moving to the Shared Service Centre (SSC), which was not universally welcomed**. Concerns ranged from: the practicalities of open plan working; to capacity and quality issues that were creating backlogs and errors in areas such as processing Mandatory Occurrence Reports and licensing. Various initiatives have started to improve the performance of the Shared Service Centre and various metrics suggest that this is starting to have a positive effect. Turnover still appears high with the best talent often moving to other jobs within the CAA. Whilst some spoke of this as a positive, it can mean that SSC staff perceive that they are not achieving a return on their training investment.

5.4 The Shared Service Centre was tasked with delivering a certain level of service with a challenging headcount reduction. **This appears to have led to a greater focus on finding efficiencies rather than delivering service quality.** The problem has been recognised and improvements have occurred over the last year. However, this has left the legacy of a loss of confidence in the SSC within SARG, and a defensive culture within some of the SSC management team. Morale within SSC appears to be improving, but clearly has some distance still to go.

5.5 Some colleagues spoke of change fatigue and being **overwhelmed by the amount of change** that was being attempted compared with the resources available, rate of staff turnover, capacity needs to deal with 'pop-up events' and the time needed to do their job properly. They appear to buy into the benefits of the proposed changes, but do not always feel they have capacity or skills to deliver what is being asked of them in the timescale. This was considered by some to be a function of hugely ambitious and able senior leaders who do not always comprehend the ability or capacity of others to work at their tempo. **There is a willingness to do things better, but not always the capacity.** On occasion people spoke of 'resource' in the context of staff numbers, but probing generally revealed that capacity (time and skillset) were more limiting factors.

5.6 The CAA has a legacy **culture that appears to have discouraged challenge**. Colleagues spoke of an era where feedback was considered to be criticism and staff were very defensive. There was acknowledgment that this was starting to change. Processes such as the Internal Review Meetings facilitated by the PBR team are a good example of creating a culture where different perspectives are considered to be of greater value than leaving things unchallenged, and in the hands of single 'experts'. There is still work to do in this regard at all levels of the organisation, both in terms of receiving and giving feedback or challenge.

5.7 **The organisation's work on Just Culture is promising**, but not fully embedded across the culture of the CAA. Some colleagues remain fearful about the consequences of errors or underperformance. Certain elements that may be found within an entity's SMS are absent or underdeveloped in the RSMS, which may be contributing to this. Internal occurrence reporting and trending is currently absent, so reporting of a failure of a process, for example, may be absent. Additionally, an independent & appropriately resourced system is required to enable colleagues to raise concerns internally. This system should be capable of quickly responding to the initial concern, and should provide feedback directly to the colleague who raised it.

5.8 There seems to be an **increasing willingness to take enforcement action** where appropriate, although the implementation remains inconsistent. Some believed that inconsistency was down to individuals, especially those who did not like confrontation, and that the situation was improving as staff were given management support and were able to see that taking such action can lead to a more positive outcome. The Airworthiness team's handling of concerns with an underperforming entity was cited as a good example.

5.9 There are good examples of how the CAA is taking a more **innovative approach to solve challenges** such as the recruitment of staff from industry. Within Flight

Operations, ‘area basing’ has proved to be successful in attracting staff who may not wish to move to Gatwick. A trial using industry-based casual Flight Operations Inspectors has recently been approved in an attempt to deal with enduring staff retention issues.

5.10 **Work being undertaken to better define safety accountabilities has strong potential**. Although the work package only started in March 2017, feedback from the LT has been encouraging. Creating clarity at all levels of the organisation in respect of accountability will have a positive effect. This will help to address concerns from colleagues that not all parts of the CAA understand how they contribute to the organisation’s objectives.

5.11 There is an increasing recognition of the **importance of training and career pathways as part of staff retention**. This includes both ‘green’ recruits, who often have little experience within the sector, to experienced technical staff who may need to enhance their skillset to take on a new role or adapt to the new requirements of Performance Based Regulation.

5.12 The **Airworthiness Capability Area was frequently cited as an exemplar** of embracing PBR principles. This was largely thought to be a function of leadership style and how this translated into the team’s approach. The team seems keen to embrace the principles of a ‘learning culture’ as demonstrated through its use of deep-dives and its sponsorship of further development work in this area.

6. Next Steps

6.1 **The establishment of the Safety and Business Assurance function creates an opportunity to embed a continuous improvement culture.** The way in which they execute their function will strongly influence employee perception and therefore has significant potential to influence the culture.

6.2 **The LT should recognise the importance of the whole organisational culture to achieving the intended safety outcomes of the CAA.** The work of SARG takes place within the context of a wider organisational setting and centralised functions such as the SSC and HR have a huge role to play. Enhancing the level of understanding of how each function influences safety outcomes will help to unify efforts towards a common goal.

6.3 **Conducting a self-assessment of the capability teams** within SARG plus centralised functions (e.g. SSC, HR) using the Safety Maturity Model is an important element in acknowledging the current position of the CAA against its ambition.

6.4 **Developing an action plan based on short- and medium-term goals** across the maturity model needs to be supported by actions which deliver appropriate cultural change. This is likely to include recruitment criteria, staff training and development as well as process and procedural enhancements.

6.5 The response to the Cranfield Safety Assurance Review will carry a high degree of significance for the workforce, especially those who are aware of the 2014 Review. It is

important that the current review is acknowledged for what it is – a concerted effort, led by the CAA Board and LT to deliver an "***empowered, learning and improving culture.***"

6.6 Sharing the outcomes of the Cranfield Safety Assurance Review is important to creating that culture. However, these are **best shared as an action plan** rather than a more traditional 'acceptance or rejection' of the findings and recommendations. Articulating the Board and LT commitment to "improve where possible" is important.

Appendix 4
CAA Case Studies Methodology

Executive Summary

1.1 In July 2016, Cranfield University was commissioned to undertake a review of SARG. The primary objective was to highlight best practice versus safety assurance challenges. Additionally, Cranfield was requested to propose a methodology for safety assurance activities that could be embedded as an ongoing function.

1.2 During the course of the Cranfield Safety Assurance Review, it was agreed that a number of stand-alone elements would collectively provide a standardised methodology for future safety assurance activities, of which the Case Studies Methodology is one element.

1.3 The Case Studies Methodology can be defined as:

'A standardised approach, based on best practice identified, to facilitate the future undertaking of "deep dives" and other safety assurance activities that focus on a specific, reasonably narrow, topic'.

1.4 It is proposed that Case Studies would be undertaken by the Safety & Business Assurance team, or by an external organisation. The methodology blends case study research methods from social science and accident investigation with the aim of providing deep learning.

1.5 As a component of the Safety Assurance methodology, Case Studies provide a framework for inquiry and analysis if applied correctly. Success depends on clear objectives, a suitably qualified and experienced team, use of relevant evidence and analysis techniques, and consideration of how lessons will be shared.

1.6 Case Studies are compatible, and share similarities, with the 'Deep-Dive' approach being developed by Airworthiness. Whilst the two may share some key differences (e.g. use in enforcement actions), the CAA should seek to align approaches as much as possible.

1.7 A proposed Case Studies methodology is described in paragraphs 8 & 9 of this paper.

The Value of Case Studies as a CAA Safety Assurance Tool

2. <u>The use of Case Studies outside the CAA:</u>

2.1 Investigation following a serious incident or accident is analogous with 'case study research' as used within social science, in that it uses a single event to generalise broader lessons for the industry. One of the challenges is to remain focused on the broader lessons learned rather than the specifics of a particular occurrence. If this is done poorly then the focus will be on individual actions or failures proximal to the event (such as human error or component failure) rather than whether deeper, systemic issues allowed or encouraged them to develop, or go unnoticed. In turn, there is also a risk that findings and recommendations focus on preventing the specific occurrence rather than future 'similar' events and as such are pitched at the wrong level.

2.2 The approach of examining a specific event in detail creates an opportunity as part of the CAA's safety assurance approach and is something that is already used to positive effect.

2.3 In its oversight of the Safety Management Systems of entities, the CAA expects them to be able to demonstrate evidence of continuous improvement. Adopting such an approach to its own safety assurance approach is key; the CAA cannot set itself a standard of merely demonstrating 'good enough' – instead it must be able to demonstrate it has a culture of, and structure for, continuous improvement.

2.4 The Australian Bureau of Air Safety Investigation (BASI) - now the Australian Transport Safety Bureau (ATSB) - adopted James Reason's 'Organisational Accident Model' in the 1990s for the investigation of not just accidents, but also safety concerns, e.g. repeated breakdowns of separation at a particular ATC facility.

(Full details of the ATSB 'Organisational Accident Model' can be found at Appendix CSM001 of this document).

2.5 On face value, the ATSB's approach appears to offer a valuable tool to the CAA for both its external and internal safety assurance activity. It provides an outline structure for examining the performance of an entity, sector or indeed internal capability area – good or bad. It focuses on the deeper systemic influences whilst including relevant specifics and is a language that is well understood across the safety space.

2.6 An advantage of the ATSB approach is that the principle also works for successes, i.e. those areas where better than expected performance is achieved. It has been used successfully for over a decade to identify systemic issues for improvement.

<u>Key Points / Insights / Recommendations for the establishment of future Case Study methodology:</u>

Case Studies provide a standardised approach to examine a specific, reasonably narrow, topic in detail.

Case Studies offer the opportunity to generalise broader lessons learned from a single event.

'Continuous Improvement' is a key cultural target for the CAA.

A 'systemic investigation' approach to Case Studies, such as that detailed in the ATSB model, offers a valuable tool for the CAA's external & internal safety assurance activity.

A 'systemic approach' to Case Studies enables the evaluation of successes, as well as failures.

3. Applying a 'systemic approach' to safety assurance:

3.1 To test the suitability of the approach for a regulator to adopt as part of its safety assurance methodology, it is worth reviewing factors that underpin ATSB's success:

- It is an **independent** investigation entity. It is not dependent on the organisations (transport regulators, policy makers and service providers) it may make recommendations to for funding.
- Its **purpose and function** is focused specifically on improving safety & public confidence in aviation, marine & rail transport[1].
- It has **powers** under the TSI Act[2] to allow it to access evidence and to compel individuals to participate in an investigation.
- It is **protected** from its reports being used as evidence in civil or criminal proceedings.
- It is **obliged** to report its findings publicly.
- It is **obliged** to involve specified stakeholders in its investigation process as laid out by ICAO (such as State of Operator, State of Occurrence etc.).
- It is **obliged** by international convention to investigate certain types of events based on severity (serious incidents/accidents).
- It may **choose** to investigate any 'transport safety matter' and may be **compelled** to do so by order of the Minister.
- It may **choose** to discontinue investigations at any time, but must share its reasons for doing so publicly.
- It uses suitably **trained and experienced** investigators.
- It is an organisation which is **trusted** by its stakeholders.
- Its organisation design means that it is able to **deploy** resources to an investigation at short notice.
- It is able to increase its resources **dynamically** through the use of technical advisors, accredited representatives and special investigators.
- It can draw **additional funding** from Government to respond to a large-scale event that may be beyond its normal budget.

Principles that may benefit the CAA in applying a 'systemic approach' to safety assurance:

- Independent;
- Empowered;
- Clear purpose & function;
- Clear criteria for starting a Case Study;
- Clear reporting criteria;
- Suitably trained & experienced investigators;
- Trusted;
- Able to increase resources dynamically.

Enablers:

- The right approach;
- The right people;
- At the right time;
- Be focused on lessons identified rather than mistakes made;
- Identify the deeper systemic issues rather than symptoms of problems;
- Identify superior as well as inferior performance;
- Be timely in terms of feedback, lessons learned & implementation.

[1] ATSB (2016) Overview of the ATSB. Accessed from https://www.atsb.gov.au/about_atsb/overview/ 8th July 2017

[2] Australian Government (2016) Transport Safety Investigation Act 2003 (Compilation date 10th March 2016 including amendments up to Act No. 4, 2016). Accessed from https://www.legislation.gov.au/Details/C2016C00617 8th July 2017

Cranfield Review of CAA Examples

4. Previous CAA 'Deep Dives':

4.1 The term 'deep-dive' or 'deep-cut' has become used within CAA to describe occasional inquiries which focus on particular entities or sectors. Whilst a formal methodology or procedure did not exist at the time that this Review was commissioned, there are several examples of the general approach being applied, three of which have been used below as examples to help define the methodology.

4.2 A draft procedure for a 'Deep Dive Review' has been developed by David Malins within the Airworthiness capability area. This work has been taking place in parallel with Cranfield Safety Assurance Review, so is not included in this report. However, its aims are broadly compatible with what is proposed here so an alignment check should be undertaken. The two approaches should be as compatible as possible, but do have some important differences.

5. Example 1: 'Safety review of offshore public transport helicopter operations in support of the exploitation of oil and gas':

5.1 The safety review of offshore public transport helicopter operations in support of the exploitation of oil and gas (hereafter known as the Offshore Helicopter Review) was announced on 24th September 2013. Its findings were reported to the CAA Board and published as CAP1145 on 20th February 2014.

5.2 The Offshore Helicopter Review was in effect a **'reactive deep-dive'** commissioned following five accidents in four years (two of which were fatal) involving North Sea helicopter operations. It supplemented accident investigations which were being conducted under the auspices of the Air Accidents Investigation Branch (AAIB).

5.3 Although effectively triggered by a specific accident (the loss of an AS332 Super Puma at Sumburgh on 23rd August 2013), it was a **sector trend** that was being examined in greater detail. In addition, the Transport Select Committee also initiated an inquiry into offshore helicopter safety which commenced its work in September 2013, but which agreed to reports its findings after the CAA completed its own review.

5.4 The Transport Select Committee did not believe that the CAA looked at two areas in sufficient detail[3]:

1. The impact of commercial pressure on helicopter safety.
2. The role and effectiveness of the CAA itself.

It did *"…acknowledge that it would not be appropriate for the CAA to lead on such work"* and instead sought a full, independent public inquiry, which has, to-date, not been commissioned.

5.5 Although the Offshore Helicopter Review was completed over three years ago, it provides a good case study for the CAA to review its safety assurance capability at the time, how it may have changed since, and what lessons are available to best inform the development of future safety assurance capability.

[3] Transport Committee of the House of Commons (2014) Summary of the Offshore Helicopter Safety Inquiry. Accessed from https://www.publications.parliament.uk/pa/cm201415/cmselect/cmtran/289/28903.htm 8th July 2017

5.6 The fatal accident at Sumburgh in 2013 highlighted very strong concerns from those workers who were dependent on helicopters to work offshore. Industry groups such as Step Change in Safety set up a Helicopter Task Group in August 2013 to address the loss of confidence in helicopter operations by the offshore workforce.

5.7 The CAA started the Offshore Helicopter Review after the Helicopter Task Group was set up, and after the Transport Select Committee announced its Inquiry. Whilst the three things happened quite closely together, it begs the question as to whether there had been the opportunity to commence such a review prior to the Sumburgh accident.

5.8 In fact there was a lot of helicopter safety activity that was already taking place both within the CAA (e.g. under the Helicopter Safety Research Management Committee) and within the sector (e.g. under the International Association of Oil & Gas Producers (OGP) Aviation Safety Subcommittee). The reaction to the Sumburgh accident was to create additional momentum and urgency for change. As such, the Offshore Helicopter Review was completed in a very short timescale – it was described as "…an 18-month report produced in 4 months[4]" and contained deliberately short timescales to force action from the industry.

5.9 In simple terms, the objectives of the Offshore Helicopter Review may be generalised as follows:

- Review the safety performance of the sector at the system level;
- Identify the threats to this performance;
- Review what has previously been done to address these threats;
- Evaluate the effectiveness of regulatory measures;
- Identify opportunities for improvement.

(Full details of the Offshore Helicopter Review objectives may be found in CAP1145).

5.10 Cranfield conducted a number of interviews with participants in the Review, principally to gather best practice insights and lessons learned. Elements which contributed to its success included:

- Clear **Terms of Reference.**
- Use of **experienced** and **credible** experts on the review team.
- Use of an appropriate external '**challenge team**' for peer-review.
- Informed by **existing intelligence** – "inspectorate had a good handle on the problems".
- Lots of **consultation to define scope.**
- Importance of the '**discovery phase**' to refining scope.
- Strong **support from stakeholders** (e.g. unions, consumer bodies).
- Recognition that the **review was 'sector-level'** and therefore likely to affect operators equally.
- **Dialogue and explanation** to gain traction for recommendations.
- **Help from statistics team** to ensure accurate comparisons.

[4] Step Change in Safety Helicopter Safety Steering Group Accessed from https://www.stepchangeinsafety.net/sites/default/files/news/2438.pdf 8th July 2017

- **Importance of following-up** actions.
- Strong **project management** by an experienced Project Manager.
- Use of **collaboration tools** (SharePoint).
- Built upon **existing workstreams.**
- Importance of '**evidence-based**' findings.
- Use of '**actions**' and '**recommendations**'.
- Seen to be an '**honest**' process focused on **improvement.**
  The effectiveness of the review is reflected, to some degree, in the **changes that have occurred** as a consequence.

5.11 As this constituted a 'pop-up' activity, it drew upon resources that had not been anticipated or planned for. By dedicating a small team to a specific set of deliverables over a short timescale, it was possible to create strong engagement and momentum. This may not have been sustainable either in terms of releasing experts from the day-to-day business or in maintaining high operational tempo.

5.12 In addressing the Transport Select Committees criticism that the CAA's review missed two important areas in sufficient detail:

The impact of commercial pressure on helicopter safety:

5.13 There are several possibilities. For example, the Review's analysis of *"…the causal factors that have contributed to previous accidents"* is likely either to be limited to what is documented by the investigation agencies involved or to intelligence held by the CAA. Investigation reports rarely document something as difficult to evidence as 'commercial pressure' even if there is a widespread acknowledgement of its influence.

5.14 Few investigation agencies around the world currently feel confident to draw such a conclusion and even fewer would be able to provide strong enough evidence to pass a 'balance of probabilities' test. This does not mean that commercial pressure is not a factor, but it is likely to be something that sits as a deeper, arguably subtle, organisational factor.

5.15 Contemporary thinking on system-thinking from academics such as Leveson[5], Rasmussen[6], Hopkins[7] and Hollnagel[8] supports the view that influences such as commercial pressure may be of great significance.

5.16 For the CAA to have drawn such a conclusion during the Offshore Helicopter Review would have been challenging, based on the evidence available and the legal action that would likely ensue.

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

The best practice highlighted in para 5.10 should be considered & utilised when planning & conducting future Case Study reviews.

A small, dedicated team created strong engagement & momentum for the Offshore Helicopter Review.

It is unlikely that the CAA could have reasonably commented upon the 'impact of commercial pressure on helicopter safety' within the Offshore Helicopter Review, but with better intelligence, it may be able to do so in future.

[5] Leveson, N G (2012) Engineering a safer world: Systems thinking applied to safety. MIT Press
[6] Rasmussen, Jens (1997). Risk management in a dynamic society: A modelling problem. *Safety Science*. **27** (2–3): 183–213.
[7] Hopkins, A (2005). *Safety, culture and risk: The organisational causes of disasters*. Sydney: CCH Australia
[8] Hollnagel, E. (2004). Barriers and accident prevention. Aldershot, UK: Ashgate.

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However, it is arguable that as its intelligence increases in quality, it may be able to draw such conclusions in the future.

The role and effectiveness of the CAA itself:

5.17 Considering the role and effectiveness of the CAA itself is also a difficult task. If this were to be done as part of the CAA's Offshore Helicopter Review then it may have necessitated a different team composition to avoid accusations of 'marking its own homework'. An independent review may have avoided such problems. Whilst none of the AAIB investigations into the offshore helicopter accidents had highlighted deficiencies within regulatory oversight *per se,* a more proactive approach to assurance within the CAA may have embraced the opportunity to review the CAA's own role and effectiveness.

5.18 With the benefit of hindsight, the terms of reference for the Offshore Helicopter Review could have been broadened to include the contribution of the regulatory system to the safety performance of the sector (including the role of CAA and EASA). Rasmussen's risk management framework includes the roles of "regulatory bodies, state government departments and industry associations" and "government policy and budgeting". In the context of offshore helicopters, this could include the influence of regulators such as CAA and HSE; quasi-regulatory bodies such as the Helideck Certification Agency and Shell Aircraft; and Associations such as the IOGP Safety Committee's Aviation Subcommittee, Helicopter Safety Research Management Committee, Step Change for Safety and so on.

Additional lessons from the Offshore Helicopter Review:

5.19 Acknowledging these constraints and opportunities, there were several other lessons learned from the approach taken to the Offshore Helicopter Review that may be of value in trying to define a future methodology:

5.20 As the Review was commissioned less than a month after the fatal accident at Sumburgh, the decision was taken to exclude this accident. This is entirely understandable based on the live AAIB investigation which was not completed until the final report was published on 15th March 2016. This avoids a risk of interfering with the independent not-for-blame investigation, but also runs the risk of delaying or losing valuable lessons, especially if the accident investigation does not go deeply into systemic issues.

5.21 The Offshore Helicopter Review focus was on a sector-level issue rather than a single catastrophic event. However, had the review been triggered in response to a single event then it may have been

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

Review of the 'role and effectiveness of the CAA itself' does not appear to have been a reasonable objective to be expected of the Offshore Helicopter Review – rather of a different, independent or external team.

The ToR of the Offshore Helicopter Review could have been broadened to include the contribution of the regulatory system to the safety performance of the sector.

rather more difficult to complete, especially as a parallel activity to an AAIB investigation and where it may be the recipient of findings and recommendations – as CAA found in the aftermath of the Shoreham Air Show accident in 2015.

5.22 The workload and tempo for completing the Review was high and participants struggled to balance the demands of the 'day job' with the efforts required to conduct the review. This was exacerbated by a lack of pre-existent formal methodology, but counteracted to a degree by the skills of an experienced Project Manager.

5.23 What was seen as a good opportunity within CAA – to group together lots of work that had already been done, was perceived in more cynical terms by industry, some of whom felt the CAA were using the review as an opportunity to bring some of their 'hobby horses' up the agenda. This indicates the importance of clarity of purpose and clear communications when conducting such a review.

6. Example 2: 'Review into the CAA's oversight of the Civil Commercial Air Transport Use of RAF Northolt';

6.1 During the time that the Cranfield Safety Assurance Review was taking place, the CAA Board initiated a 'review into the CAA's oversight of the Civil Commercial Air Transport use of RAF Northolt' (hereafter known as the RAF Northolt Review).

6.2 The RAF Northolt Review was led by the Safety and Business Assurance Team and provides an excellent development case for the Case Study Methodology. This was the first review to be conducted within the Safety and Business Assurance team, which was formed in January 2017.

6.3 It is not the purpose of this section to 'review the review'; feedback was provided from Cranfield during the RAF Northolt Review as part of the peer-review process. Instead, we aim to describe how this may inform future methodology for Case Studies as part of the safety assurance methodology.

6.4 The RAF Northolt Review was triggered as a consequence of the 2015 Judicial Review, which was brought by Oxford and Biggin Hill Airports, as to whether RAF Northolt must have the same standards for private jet operations as civil aerodromes. The Judicial Review concluded that CAA is the statutory regulator required to determine safety standards for civil aircraft operating into military aerodromes.

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

The focus of the Offshore Helicopter Review on a sector-level issue rather than a single catastrophic event was a positive aspect.

Participants in the Offshore Helicopter Review struggled to balance the demands of the task alongside everyday work activities.

The Offshore Helicopter Review was hampered by a lack of methodology.

The input of an experienced Project Manager was of benefit to the Offshore Helicopter Review.

Stakeholder communications are vital.

6.5 The RAF Northolt Review utilised Mind at Work's proprietary 'Multi Perspective Problem Solving' approach to define a clear problem statement. This approach to problem solving argues that defining the problem (or framing the opportunity) is the key to finding a solution. By necessity this process needs to be iterative, as investigation often reveals problems that were not clear at the time. Simple questions are often a good place to start.

6.6 In the case of the RAF Northolt Review, there were two closed questions:

1. *Is the CAA aware of its regulatory responsibilities regarding the civil use of RAF Northolt?*

2. *Is the CAA fulfilling its regulatory responsibilities regarding its oversight of the civil use of RAF Northolt?*

6.7 The first question is arguably more challenging to answer as it requires an evaluation of what 'aware' means at a corporate level - one person? senior management team? etc.

6.8 The second question is simpler because there is a clearer threshold in terms of regulatory responsibilities.

6.9 However, if a more general version of the same question was asked about the CAA, *'Is the CAA fulfilling its regulatory responsibilities?'*, then the challenge may be to answer what level of compliance or performance would equate to 'fulfilling'? (For example, although UK's effective implementation score in its last ICAO Universal Safety Oversight Audit Programme (USOAP) was higher than the global average in all categories, it did not achieve 100% in any).

6.10 An alternative approach is to create a hypothesis for testing – an approach often used in accident investigation. The aim is not to prove the hypothesis, but rather to test it based on the analysis of evidence. This can be done by creating a positive and negative hypothesis although, in practice, the evidence will support or refute a single hypothesis.

6.11 In the case of the RAF Northolt Review, one such hypothesis could be *"CAA is failing to fulfil its regulatory responsibilities regarding its oversight of the civil use of RAF Northolt"* - which leaves the reviewer to examine evidence both to support and refute the claim and then make a judgement on the balance of evidence.

6.12 This may seem a subtle difference, but can help to enhance the objectivity of a review. If the aim is to 'break' a hypothesis rather

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

The creation of a hypothesis for testing as part of a Case Study can help to enhance the objectivity of a review and reduce the threat of bias.

than ‘make’ it, then the inevitable threat of bias can be reduced. This ensures that a hypothesis is tested in an objective way.

6.13 In simpler terms, the reviewer needs to be able to answer a series of ‘why’ questions to ensure that they examine the phenomena to sufficient depth. If a parallel was drawn with an accident investigation then it would start with an ‘event’ and the need to understand what led to that event.

6.14 Such an approach is used proactively through a bow-tie diagram and the RAF Northolt Review developed two as a framework for the methodology. The first was built around an accident *(aircraft loses control on landing)* and the second a failure of compliance *(RAF Northolt not meeting safety criteria and standards)*. This allowed the team to hypothesise the nature of the threat and barriers that should or could have been in place.

6.15 Bow-ties are increasingly being used as an investigation tool. An advantage is that it creates a repeatable methodology for similar events. Both of the RAF Northolt Review bow-ties could be used in future to assess any airport, even if the problems they highlight end up being different. As more Case Studies are conducted, so the library of bow-tie diagrams will continue to grow and be available for other uses.

6.16 A bow-tie is useful for examining what barriers were absent or ineffective. Reason’s approach to examining accidents starts by establishing which barriers failed or were absent, recognising that such ‘failures’ are generally associated with individual actions or technical events (see Appendix CSM01, figure 1). This represents the first level of any enquiry but tends to describe ‘what happened’ rather than ‘why’.

6.17 The next step is to understand ‘local conditions’: those things that influenced individual actions or technical events and which perhaps dictated why they happened ‘now’. In the context of the bow-tie diagram developed for the RAF Northolt Review, an unstable approach may happen because the crew had not configured the aircraft early enough. The reason for it to happen ‘now’ may be because this particular crew had not flown to RAF Northolt before and therefore had a high workload.

6.18 Of greater value is to understand the risk controls that are in place to prevent, to mitigate or to manage the threats to safe operation, and in doing so move to deeper, systemic issues that may well benefit a wider population if addressed.

6.19 In the context of the RAF Northolt Review, this may mean looking at what measures or processes should be in place. For example,

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

The use of bow-tie diagrams as a framework for the methodology of a Case Study ensures that the reviewer examines the phenomena to sufficient depth.

Bow-tie diagrams enable a repeatable methodology for future use when reviewing similar events.

Bow-tie diagrams enable the examination of what barriers were absent or ineffective.

Examination of what barriers were absent or ineffective tends to describe ‘what happened’.

An important next step is to examine those things that dictated why an event happened ‘now’.

the review found that there were some specific examples of non-compliance with ICAO standards and recommended practices. One risk control is for such non-compliances to be notified to ICAO through a 'notification of difference' which in turn would have been reflected in the Civil Aeronautical Information Publication (AIP) and commercial charts from sources such as Jeppeson.

6.20 Once again, the review should seek to go to the next level and understand why this did not happen – was it the result of an error; lack or process; lack of understanding; misinterpretation, etc.?

6.21 In terms of safety assurance, the types of questions that are asked through such a review are key and must not only answer the question 'why' to sufficient depth, but also deliver a 'so what' answer. In other words, the review's value comes not simply from explaining what happened and why, but also from exploring what can be learnt to prevent such a problem from recurring.

6.22 The RAF Northolt Review was focused on answering specific questions regarding that aerodrome. However, many of the recommendations are broader in scope, which is an important principle for extracting value from such Case Studies.

6.23 An opportunity that has perhaps been underappreciated is in terms of lessons learned. Specifically, what does the situation at RAF Northolt and how it was able to develop unnoticed over a period of time tell us about the manner in which capability teams operate and more generally the safety assurance capability of the CAA? For example, what does this Case Study tell us about other government aerodromes; co-working with MAA; integrity of information in aeronautical publication; the alignment of military safety standards with their civilian equivalents; efficacy of coordination bodies such as the Government Aerodromes Coordination Group (GACG); and so on.

Lessons Learned:

6.24 In terms of methodology, the Northolt internal review benefited from:

- **Defining clear questions** to establish the bounds of the review.
- An approach that was **exploratory** / investigative rather than audit-based.
- A focus on **opportunities for improvement** rather than merely compliance.
- Defined areas of **focus.**
- **Referring** to relevant standards and regulations.
- Multiple sources of **evidence.**
- The development of **bow-tie diagrams** to better understand systemic defences.

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

It would be beneficial to look at why the risk controls to prevent, mitigate or manage the threats to safe operation did not happen.

It is important to not only answer the 'why' but also the 'so what'.

Value comes from both explaining what happened and why, and from exploring what can be learnt to prevent such a problem recurring.

The CAA should consider what the lessons learned highlight about its assurance capability:

- What data is available that might have shown concerns regarding operational safety?
- Why did it take a Judicial Review to identify CAA's responsibility for the aerodrome?
- What are the characteristics of the situation that might be applied to other things to identify potential problems early on?

- Reporting **without naming individuals** (apart from listing those interviewed which may not be necessary).
- An **experienced review team** with a focus on learning not blaming.
- Recommendations that were pitched **beyond the specific entity** in focus.
- Reflection on **opportunities for the CAA** to develop.
- **Fast completion** time (2 months).

6.25 Suggestions for future development:

- Use of **hypotheses** rather than closed questions.
- Greater focus on '**what does this tell us about ourselves**' questions, e.g.
  - Could we have spotted this sooner?
  - Why did we spot it now (could we have missed it for longer)?
  - Are our processes incomplete?
  - Are our practices different to our processes?
  - What has changed since the problem was identified?
  - Where else may similar problems lie in CAA?
- Recommendations which afford more **effective monitoring of completion**, e.g.
  - Measurable (e.g. what would an organisation need to do to provide it had 'reviewed' or 'considered' something?
  - Time-bounded
  - Separate recommendations for each organisation

7. Example 3: 'The REDACTED Deep Dive':

7.1 The Airworthiness Capability Team have conducted several 'deep dives' in recent years including REDACTED.

7.2 REDACTED. The overall aim was to provide insight into how the CAA could improve its ability to proactively manage risk. It made conclusions and recommendations in five areas:

- Accountability, on notice and escalation
- Independent deep cut / dive 5 year reviews of complex organisations & entities
- Big data – performance indicators
- Resource to risk, inconsistencies, regulatory capture & governance
- Field force skill sets
- Conflicting priorities & our best people

7.3 The majority of conclusions and recommendations were could be generalised across SARG, which is in keeping with the aim of case studies. REDACTED

7.4 Interviews with participants in / close to REDACTED deep dive revealed the following:

- Providing sufficient resource is **not simply about manpower, but also the right skill-set** – for example to ask the right questions, to work with the entity to access relevant information.

- The importance of looking at **performance / reliability data over longer periods.** REDACTED.

- **Organisations tend to collect data for themselves.** Where they share it with CAA, there has not always been sufficient resource or capability for the analysis required to reveal longer-term trends.

- A **focus on the 'day-to-day' can mean that there is not sufficient time devoted to understanding how the bigger risk picture is changing.** This is a mindset and resourcing issue for frontline CAA staff and an opportunity for managers.

- **Dashboard information requires careful interpretation and therefore domain knowledge.** This can be especially problematic when turnover of skilled and experienced staff is relatively high. Similarly, there is a critical need for an objective, evidence-based approach to avoid focusing solely on areas that are most familiar to the individual involved.

- Several factors including leadership and ownership changes, structural and fleet changes, high staff turnover, low morale and ageing aircraft provided some indicators that all was not well. **An intelligence-led approach to regulation needs to be capable of picking up on a range of threats such as these in building an accurate risk picture.** Reasons why this may not happen include; the close proximity of field force staff to an entity (and therefore a risk of capture); a lack of relevant information being supplied to CAA; or a failure of the CAA to ask the right kinds of questions and to apply sufficient rigour to the answers received, or to take due account of non-tangibles.

- The **importance of leading indicators** REDACTED.

7.5 REDACTED deep-dive identified a range of learning opportunities in line with the evolution of the CAA towards full performance based regulation. It highlights both missed and new opportunities to improve the organisation's safety assurance capability. It also provides evidence of maturity within the CAA which allowed such an internal inquiry to take place and deliver findings pitched at system improvement level.

7.6 The REDACTED, RAF Northolt and Offshore Helicopter case studies provide useful context for the proposed methodology for use in safety assurance. This is detailed in section 8.

Proposed Case Study Review Methodology

8. Enabling Principles:

Integrity and trust

8.1 Critical elements to a successful Case Study are the integrity of, and **trust** in, the process and those who are completing the review. This will be established on the basis of a number of factors including:

- Governance arrangements;
- Credibility and experience of those involved in the review;
- The approach taken by those involved in the review;
- Appropriate protections for those participating in the review;
- Reporting format and distribution;
- Feedback from previous Case Studies.

Independence

8.2 An important element of governance is how best to achieve a balance between full independence and **functional independence**[9]. A fully independent review would be undertaken by an agency outside CAA, such as the AAIB or National Audit Office and is likely to only occur when an event has occurred with adverse consequences, e.g. following an accident. A Case Study aims to be a 'normal' process of continuous improvement rather than exceptional event, although it may be appropriate to conduct such a review following a 'pop-up', which may include an accident. When a Case Study takes place in such circumstances, it should be very clear that it is an entirely separate activity to an external review.

8.3 There should be sufficient independence to allow it to achieve its aim of continuous improvement. As such, the sponsor should be the Head of Safety & Business Assurance who in turn should be able to report findings directly to the Group Director, Safety & Airspace Regulation, the Chief Executive Officer or, if appropriate, Board Chair.

Empowerment

8.4 A Case Study should have the brief to 'go anywhere; talk to anyone; ask anything'. For this to be effective, this requires explicit support from the CAA Leadership Team.

8.5 Explicit policy is required across the CAA to assure that anyone participating in a Case Study does so within the context of Just Culture principles. The focus is on learning not blaming and care should be taken to ensure that this is strictly adhered to. If full and open cooperation from colleagues is to happen, it may take some time to build sufficient trust and confidence in this approach.

Key Case Study Enablers:

- **Integrity & trust;**
- **Independence;**
- **Empowerment;**

Sufficient independence to achieve the aim of continuous improvement.

The sponsor of Case Studies should be the Head of Safety & Business Assurance **[REC 45]**.

There should be no barrier to the sponsor reporting Case Study findings directly to GDSAR, the CEO or, if appropriate, the Board Chair **[REC 47]**.

Explicit support from the Board, CEO and GDSAR is key.

Anyone participating in a Case Study should do so within the context of Just Culture principles **[REC 48]**.

[9] JAHI, H., ELLIMAN, R. and VALLET, J., 2007. Transparency, independence and in depth with regard to safety oriented road accident investigation. Road Safety on Four Continents Conference 14-16 Nov, Bangkok, Thailand. Accessed from Loughborough University 9th July 2017

Peer Review

8.6 A robust process for peer review is important to the success of a Case Study. This includes at the terms of reference and discovery phases, the analysis phase and during report writing.

8.7 The peer review process may be internal or external and should ensure that the review is suitably scoped and resourced, objective and that the logic of the analysis is robust.

8.8 A peer reviewer cannot be part of the Case Study team and needs sufficient insight into an area without being from the part of the organisation under review. Whether it is a single person or a group would depend on the size and nature of the review.

Team Composition

8.9 Case Studies should be conducted by those who have sufficient insight into a particular area. This will help to establish their credibility and ease their understanding of technical detail. However, this should not be interpreted too narrowly as there is often value in asking the 'naïve' questions in order to understand a particular situation. An important distinction is that such individuals may become expert in conducting such reviews, but will always draw upon subject matter experts to interpret specific details.

8.10 One possibility is to recruit people into the Safety Assurance area from within CAA for a fixed period of time, say 2-3 years. This would have the advantage of bringing insight from the business into the role, give sufficient time to master the skill of conducting such a review and then take the approach and mindset back into the business to help with the cultural transformation. This approach has been found to be valuable in other sectors.

8.11 Whilst it may be possible to dynamically allocate staff to assist with a Case Study, there should always be a core team of suitably trained and experienced staff. If additional support is required, e.g. in the event of a major 'pop-up' such as the Offshore Helicopter Review, then temporary secondments may be appropriate, but this is not a long term proposition, especially as front line resources are already at a premium.

8.12 Project Management is vital to ensure that relevant evidence is collated, interviews are arranged, scope creep is avoided and deliverables are accomplished to agreed deadlines.

8.13 Training for Case Study team members should be based on not-for-blame investigation principles. This should include evidence collection, interviewing skills, human factors, analysis techniques, recommendation writing and report writing. This will make a significant difference to the quality and effectiveness of such a review.

Key Case Study Enablers:

- **Peer-review;**
- **Team composition;**

Robust peer review is important to success.

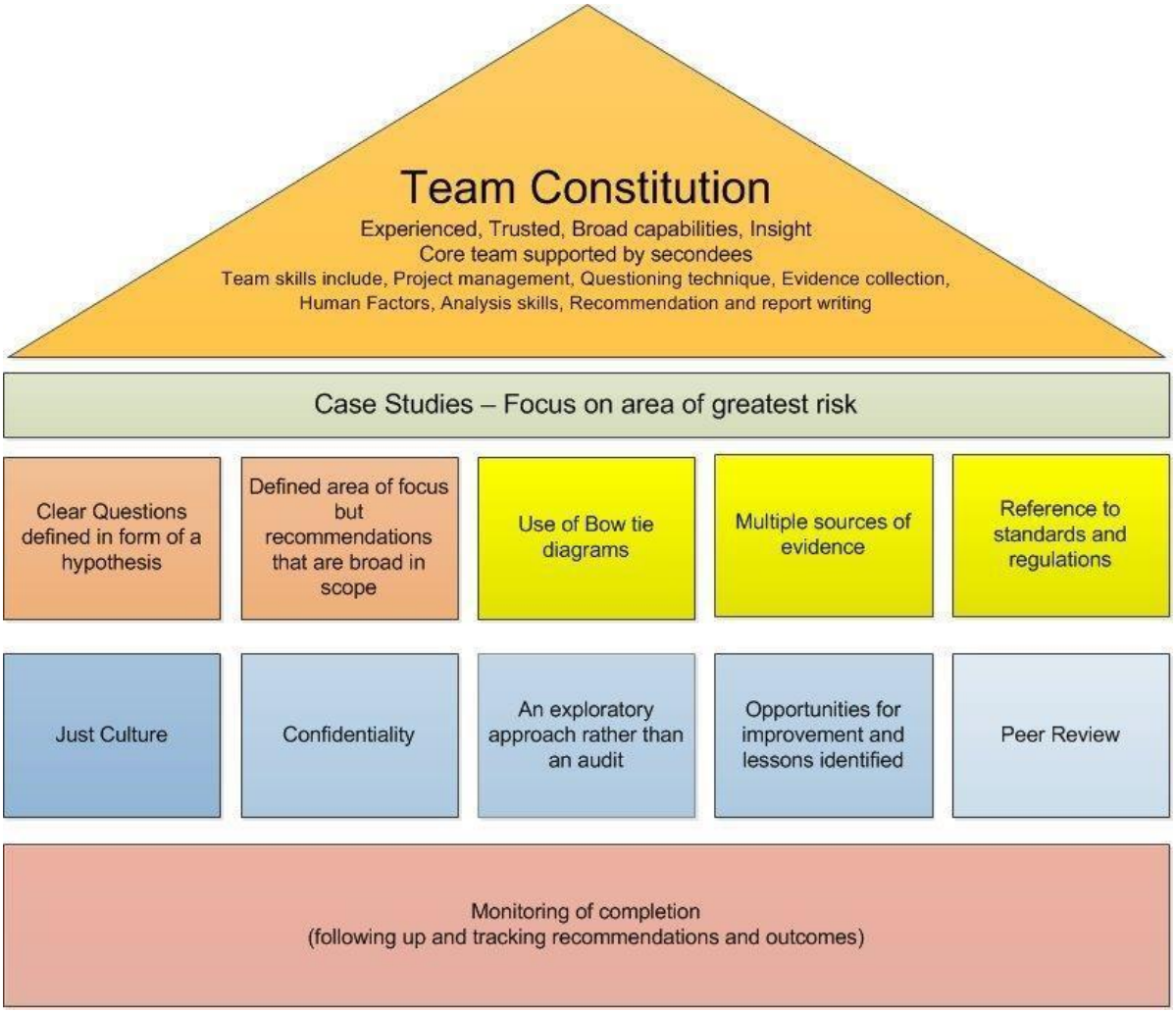
Case Studies should be undertaken by those with sufficient insight into a particular area **[REC 49]**.

2-3 year secondments would be beneficial for resourcing Case Study activities.

A core team of suitably trained staff, including Project Management skills, is essential for conducing Case Studies **[REC 50]**.

Training for Case Study team members should be based on not-for-blame investigation principles **[REC 51]**.

8.14 The following illustrates the Cranfield team's proposed Case Study team composition / skill-sets and focus: **[REC 52]**



9. Case Study Methodology: [REC 53]

Purpose

9.1 The sole purpose of a Case Study is to identify opportunities for continuous improvement. Findings should focus on systemic improvements rather than individual performance and may include observations about better than anticipated system performance as well as any deficiencies.

9.2 A Case Study shall focus on those areas of greatest risk to the CAA or which may yield the greatest opportunities for improvement.

9.3 The purpose of a Case Study should be clearly communicated to all participants along with clear assurances as to how information will be used.

Criteria for commencing a Case Study

9.4 A Case Study may be triggered in several different ways:

1. A direct request from the Board, CEO or Group Director, Safety & Airspace Regulation, to examine an entity, sector or capability area.
2. Concern(s) raised within a capability area regarding an entity or sector.
3. A proactive case study review initiated by the Safety Assurance team as part of the systematic, ongoing assurance of the CAA's safety obligations and the effectiveness of the safety barriers provided by the CAA.

9.5 The number of Case Studies that may be undertaken over a period of time will be limited by resourcing. Some form of risk assessment process may therefore be valuable to establish the benefit of looking at a particular area, although this can never be an exact science. This is particularly the case if a proactive review looked at an area that seemed to be performing better than others – using a 'safety-II' approach.

Terms of reference or problem statement

9.6 The terms of reference for any Case Study will need to be tailored in collaboration with the Head of Safety & Business Assurance.

9.7 Alternatively, where a reactive Case Study has been triggered by a specific concern, a problem statement may be most useful. This will then allow the next stage of the review to undertake a root cause analysis of how a particular situation has developed.

Discovery phase

9.8 The initial phase of 'discovery' will inevitably start with 'known knows' and start to move into things that were 'not known'. This is

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

A Case Study shall focus on those areas of greatest risk to the CAA or which may yield the greatest opportunities for improvement.

The Case Study's purpose should be clearly communicated.

A risk assessment process may be beneficial in establishing the benefit of a Case Study.

The Head of Safety & Business Assurance should sponsor the terms of reference for any Case Study **[REC 46]**.

A problem statement may be most useful for reactive Case Studies.

an iterative stage which is in part led by available evidence and the review team's pre-existing knowledge. The team need to be open-minded in seeking evidence and to the direction that the evidence may take them. They should be prepared to re-visit the terms of reference or problem statement.

9.9 The development of new, or use of existing, bow-tie diagrams will help to bring structure to the discovery phase and provide signposts for further evidence collection. It will also provide a framework for the analysis phase.

9.10 Evidence and information should be drawn from a wide range of sources whilst ensuring their provenance. It is likely the documents, statistical data, intelligence and interviews will form the main sources of evidence. Original copies should be sourced when possible and interviews should be undertaken using appropriate techniques. They should be inquisitorial not accusatory; questions should be open and not 'lead the witness' to a particular answer.

Analysis

9.11 There are two distinct elements of analysis – the process or doing it and a section in the final report. The latter should be a clear description of how the situation developed based on evidence. In case study research, scientists achieve strong results by using multiple sources of evidence and triangulating them to reduce the 'inductive leaps' that need to be made.

9.12 The analysis process will benefit from a multidisciplinary team and an element of peer review. This needs to be reflected in team composition and may involve calling subject matter experts into an analysis review.

Reporting

9.13 The format of the report is very important. It is the main vehicle for achieving the aims of Case Studies – continuous improvement. The language used should avoid allocation of fault or blame and instead focus on sharing lessons.

9.14 Whilst the CAA clearly likes its documentation to be formal, readability is key to the success of Case Studies. This means that the audience needs to be carefully considered; far better to produce a report that a large number of people can learn from than one that is only targeted at a specific specialist group.

9.15 Whilst a standard format may be valuable, it must not be so formulaic that reports become stilted. Each should answer a broad question – what have we learned from this.

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

The discovery phase may result in revision of the ToR or problem statement.

The use of bow-tie diagrams is valuable in the discovery phase.

Analysis should provide a clear description of how the situation developed based on evidence.

SMEs in analysis review may be of benefit in the Case Study team.

The language and 'readability' of a Case Study report is very important.

The target audience needs to be carefully considered.

Feedback to participants is essential, whilst maintaining confidentiality.

Time-bound delivery is essential.

9.16 Colleagues who have been part of the process e.g. by participating in an interview, should get feedback from it. If there is any concern that an individual may be identifiable from a review or may be cast in a negative light then they should be approached before the report is distributed, however identification should be by absolute exception.

9.17 Whilst different topics will take longer to complete than others, and resources will dictate capacity, Case Studies should be completed and distributed within an agreed timescale.

Legal Considerations

9.18 An internal review process like this is highly appropriate for any organisation working within a safety critical industry. Concerns about a Case Study documenting things that become discoverable and damaging the organisation are balanced by being able to show that the CAA is a learning organisation that is proactively seeking opportunities for continuous improvement.

Sharing Lessons Learned

9.19 A Case Study should result in more than a report. If lessons are to be shared then a communications plan should established for each.

9.20 The Safety and Business Assurance Team should be highly visible within the organisation and may also have an important external role. By demonstrating an open approach to learning, this helps to establish the cultural change that this review has highlighted. Trust is likely to grow as the organisation is seen to reflect honestly and objectively with the things that it has got wrong or not done well.

Key Points / Insights / Recommendations for the establishment of future Case Study methodology:

Case Studies indicate that the CAA is a learning organisation that is proactively seeking continuous improvement.

A communications plan should be established for each Case Study.

The Safety & Business Assurance team should be highly visible to establish cultural change & grow trust.

Appendix CSM01
Best Practice Organisations

A1. The 'systemic approach' to investigation:

A1.1 For many years, the commonly accepted view of accident causation was based around a linear sequence of failures, or 'links' within an accident 'chain'. Investigations were often focused on the elements of failure that could be evidenced and that often meant a focus on the actions and events immediately prior to an accident.

A1.2 Whilst better crashworthiness led to increased survivability (and therefore witnesses who could explain what happened) and an increase in recorded data have helped to reveal failures to a greater degree of detail and accuracy, the more effective gains have come from focusing beyond the 'symptoms' (the 'what' and 'how') to the deeper causes and influences (the 'why'). Earlier work around barrier models or the domino model evolved to the epidemiological approach taken by Professor James Reason and subsequently adopted by ICAO.

A1.3 The Australian Bureau of Air Safety Investigation (BASI) – now the Australian Transport Safety Bureau (ATSB) adopted Reason's 'Organisational Accident model' in the 1990s for the investigation of not just accidents, but also safety concerns e.g. repeated breakdowns of separation at a particular ATC facility. Over time and based on real-world application, the model was modified as shown in figure 1.

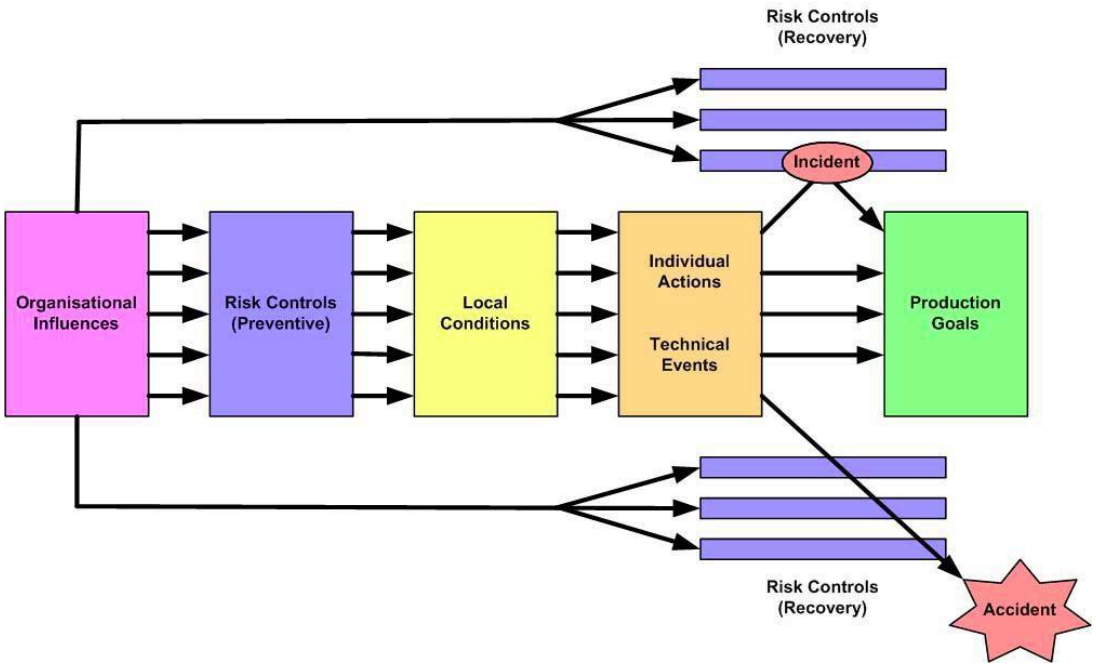


Figure 1 Modified Organisational Accident Model (Source ATSB, 2008)

A1.4 The modified model demonstrates that production goals (such as safe arrival at a destination) are normally achieved despite organisational influences, local conditions, individual actions and technical events. This is often due to risk controls designed to either prevent problems or to recover if they still occur. In understanding a failure within a system, resulting in a near-miss, incident or accident, all of these levels of influence should be considered. This has led the ATSB to define five simple elements to its investigation approach which are shown in figure 2.

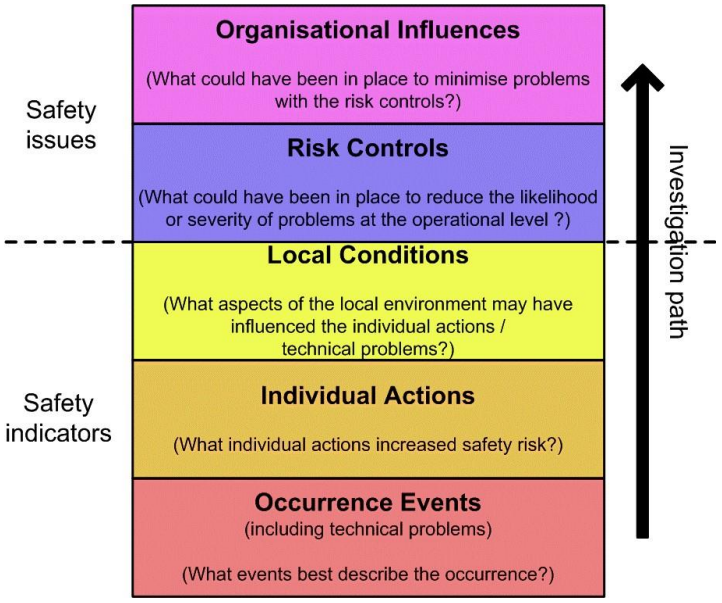


Figure 2 Investigative analysis model (Source: ATSB, 2008)

A1.5 Whilst, intuitively, this is a powerful way of focusing on deeper, systemic issues, its use in accident investigation can be challenging and therefore not especially widespread. This is for several reasons including the culture of investigation in many parts of the world.

A1.6 Evidence towards the top of the model shown in figure 2 is often much harder to define precisely, especially compared to something which is tangible, such as a component failure or something recorded as flight data. It is a method which is dependent on a willingness to learn rather than a willingness to find fault and allocate blame. The less tangible sources of evidence are tested through social science methods to triangulate and corroborate multiple sources before drawing conclusions. This can be time-consuming and at times controversial, especially when senior management, regulatory or government decisions become the focus of an investigation.

A1.7 At its simplest, the approach has much in common with root cause analysis techniques such as '5 whys'. It provides a framework for the analysis to go beyond the proximal causes, indicators or symptoms and deeper into the things that created, influenced or failed to prevent them. In doing so, the investigator is much more likely to identify opportunities for improvement that will have the greatest benefit, rather than becoming focused on preventing a recurrence of the specific event.

A1.8 In simple terms, the ATSB approach focuses attention on the organisational influences and risk controls, rather than the 'safety indicators' such as technical problems and individual actions.

- ***Organisational Influences*** *may include elements such as organisational structure, change management, management skills, technical and non-technical skills, culture and climate, customs and practice etc.*
- ***Risk controls*** *may include initial and on-going training, job design, procedures, policies, intelligence and reporting, safety data and analysis, evaluation and decision making methods etc.*
- ***Local conditions*** *may include workload, fatigue, experience, stress, peer pressure, interpersonal conflicts etc.*

A1.9 An advantage of this approach is that the principle also works for successes, i.e. those areas where better than expected performance is achieved – as advocated through Eurocontrol's 'Safety II' approach. One advantage of looking at successes is that people are generally more willing to share information about what they did right rather than what they did wrong.

Appendix 5
CAA Safety Maturity Model

Executive Summary

1. Background:

1.1 In July 2016, Cranfield University was commissioned to undertake a review of SARG. The primary objective was to highlight best practice versus safety assurance challenges. Additionally, Cranfield was requested to propose a bespoke methodology for CAA safety assurance activities that could be embedded as an ongoing function.

1.2 During the course of the Cranfield Safety Assurance Review, it was agreed with the CAA that a number of stand-alone elements would collectively provide a standardised methodology for future safety assurance activities, of which the Safety Maturity Model is one element.

1.3 The Safety Maturity Model can be defined as:

'A method for the CAA to evaluate its progress towards ambitious goals as the world's leading aviation safety regulator. It takes the form of an inward looking tool that enables the CAA to identify areas for improvement in a systematic way, and that evidences the CAA's level of safety maturity with objectivity'.

2. Development of a CAA Safety Maturity Model: [REC 54]

2.1 The aim of the Model is to provide a qualitative assessment of the transition towards a fully optimised approach as the world's leading performance based regulator. It is intentionally aspirational to create improvement opportunities around elements that underpin superior performance. It is not designed to be a 'one-time assessment' but rather a scale to demonstrate change over time, as culture and consistency continue to improve.

2.2 Many organisations would not have sufficient cultural maturity to use a model such as this. The willingness of the CAA to develop and implement the Safety Maturity Model speaks very positively about the organisation. However, for the model to be of benefit, it must be used to set targets for, as well as to measure, change over time.

2.3 The Cranfield Review team anticipate the following five steps to use the model effectively:

Step One - Develop the Model:

2.4 The Model builds on existing peer-reviewed research into maturity models in other disciplines, and has then been tailored specifically for the work of a regulator. The maturity models utilised to develop the CAA Safety Maturity Model are referenced within the Model itself (detailed at paragraph 5). The Model reflects the journey towards full implementation of Performance Based Regulation (PBR), and therefore

includes a high degree of aspiration. As such, initial ratings are likely to be at the lower end of a 5-point scale.

2.5 The Model contains detailed descriptions of 12 Elements and 5 levels of increasing maturity, and can be applied either at organisational or capability area level. For each Element, we have included examples of probing questions to assist in determining what level of maturity is most appropriate.

2.6 This development work has involved the Cranfield team gaining a close understanding of the CAA, based on extensive review of documents, observation of IRMs, participation in workshops and interviews. There are many useful observations to be made in terms of areas for improvement which are contained in the main report and other appendices.

Step 1 is complete – see paragraph 5.

Step Two – Share and validate the Model:

2.7 The Model has initially been validated by the Safety Assurance Review Steering Group. The Leadership Team, ExCo and Board should now review the draft Model and be comfortable with its content. This is to ensure that its wording is correctly understood and that it provides the basis for a useful roadmap for the cultural transformation that is needed. Care should be taken to ensure appropriate balance between a model that is sufficiently tailored for the CAA and one that can be used by other regulators, and therefore provide future benchmarking capability. In other words, the Model is not designed only to describe the CAA's position, but rather to offer something that can also be used to identify exemplars from comparative organisations.

2.8 The Leadership Team should also discuss areas for improvement identified in step one above, to agree those for progression.

Step 2 commenced at the LT workshop on 14 August. Agreement reached at the October ExCo & November Board is expected to complete this step. See paragraph 6.

Step Three – Self-rate the baseline:

2.9 The Model will be most effective if it is 'owned by the CAA' rather than 'done to the CAA'. Each area of interest (e.g. capability team) will be asked to rate itself against the 12 Elements of the Model. To justify their rating, they will need to provide evidence which would then be reviewed either by the Safety & Business Assurance Team or an external group (such as the Cranfield team) for consistency. This may result in a request for further evidence or moderation of the rating.

2.10 Attempting to rate in this way is challenging. Inevitably there will be different views on the exact positioning, based on differing perspectives and types of evidence. This is normal and to be expected. The greatest value comes from exploring the reasons behind such divergence of view, and how best to evidence change.

2.11 One approach could be to ask a third-party such as the Cranfield team to offer an initial estimate of where it thinks the CAA is (supported by sufficient and representative

evidence against each of the Model's statements), and to then allow the CAA to provide additional evidence to moderate this initial assessment. However, this approach should be used carefully as there is a risk that some interpret such an estimate as either an objective 'score' of the organisation and therefore 'proof' of deficiencies, or lacking in credibility because the external team would not have the same level of access or insight into the organisation as those who work within it. This would be counterproductive and potentially harmful to the culture at a critical point in its evolution. Having demonstrated sufficient leadership to embrace the concept of an aspirational maturity model, a poorly-executed baseline exercise risks decreasing the very thing it has set out to rate.

2.12 The CAA must 'own' the model and therefore its assessment of where it believes it is on the journey. From this perspective, the rating should support the view that the organisation is becoming sufficiently mature to recognise that continuous improvement is essential to achieving its aim to be the world's leading performance based regulator. It also needs to provide sufficient headroom for step four below.

For the CAA to 'own' the Safety Maturity Model, the CAA must agree and implement the self-rating itself. It is understood that the proposal for this self-rating will be presented at the October ExCo and November Board. No further reference to Step 3 is therefore made within this report.

Step Four – Use the baseline to define a change plan:

2.13 Each Element of the Model contains short descriptions of what may be expected at each stage of maturity. It is not a 'yes or no' checklist, and in many areas the answer may be 'to some degree'. This points to areas where consistency needs to be improved, and therefore where there may be some good examples within the organisation to follow or poor examples where improvement may be targeted.

2.14 The Model is designed to create the right discussions within capability areas and across the organisation, to identify both exemplars and areas for improvement. As a management tool, the model provides an opportunity to prioritise resources; it is arguably more critical that some areas of the organisation reach a higher state of maturity more rapidly than others. At Board level, the maturity rating provides a dashboard of the organisation's transition over a period of time – measuring culture rather than just climate.

For the CAA to 'own' the Safety Maturity Model, the CAA must agree and implement any change plan itself. No further reference to Step 4 is therefore made within this report.

Step Five – Share the model:

2.15 Sharing the Model with two communities may have longer-term benefits for the CAA.

2.16 Firstly, encouraging other safety regulators who have embarked upon a similar journey towards PBR would be a good way of developing the opportunity for benchmarking and peer-review. This may involve some adaptation of the Model, as well as agreement as to how best rating information could be shared (e.g. through a third party

initially) and may be phased – starting with benchmarking and over time developing into peer review. This principle may apply to regulators from overseas (e.g. Transport Canada Civil Aviation (TCCA), the Civil Aviation Safety Authority (CASA)) and other sectors in the UK.

2.17 Secondly, the stakeholder community could be a useful partner, although this would need care as it may include people who are happy to 'score' the CAA but who wouldn't necessarily have the courage or maturity to score themselves! An external reference panel (such as from the largest entities) may offer their perspective of the CAA's cultural maturity. Whilst this will inevitably be different from the CAA's internal view, it would provide an important view as to how effective the CAA has been in communicating its transformation.

2.18 Step five can commence in parallel with other activities. The Office of Rail and Road (ORR) has its own Risk Maturity Model (RM3), which it has co-developed with the Health and Safety Laboratory (HSL) and the European Union Agency for Railways (ERA), and which is now being used by ERA to look at national regulators. Both ORR and other regulators such as TCCA have expressed interest in further collaboration. Forming these relationships now will help to accelerate full implementation.

See also paragraph 7 and Appendix SMM01 below.

3. Conclusion:

3.1 The Safety Maturity Model represents a valuable tool for the CAA if used appropriately. It is used to measure something that is difficult to measure and to provide a management tool to identify improvement opportunities.

3.2 Further development work is required to realise its potential and to ensure it is fully accepted and embraced by the CAA.

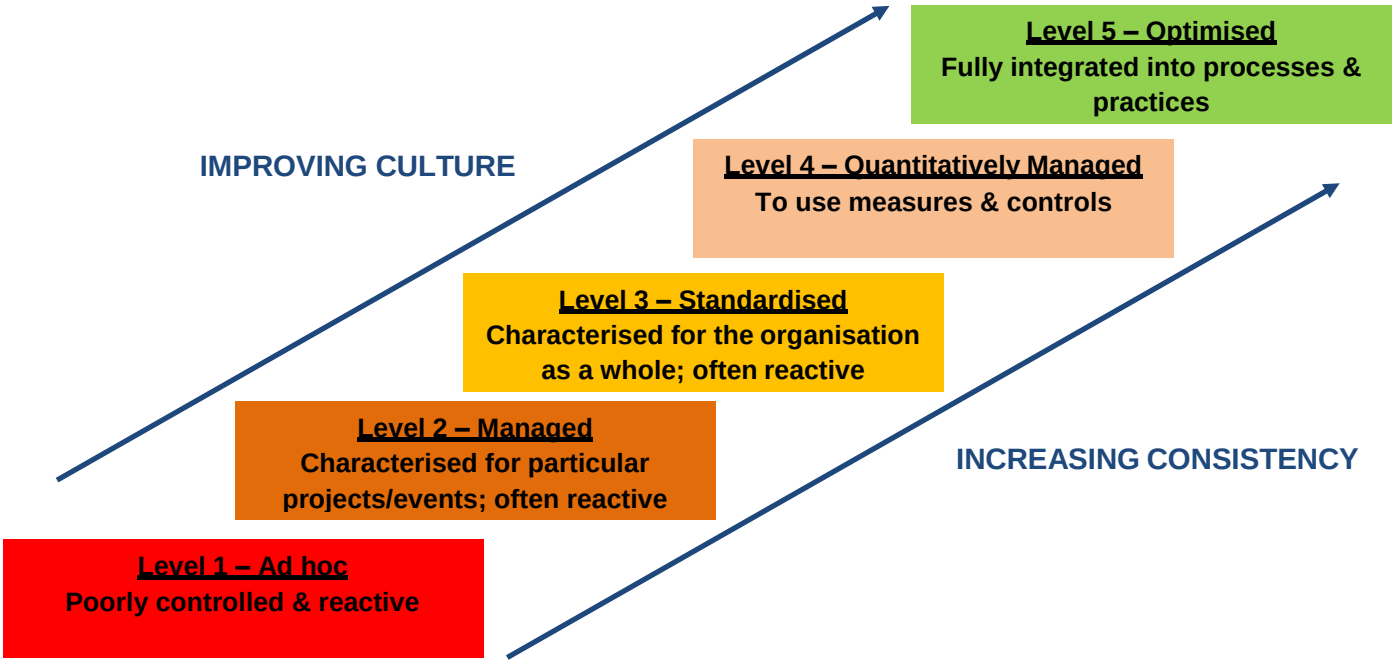
4. How to use the CAA Safety Maturity Model:

4.1 The CAA Safety Maturity Model is formed of 3 *Sections*, which are further divided into 12 *Elements*:

Section:	1: Culture & Competence	2: Leadership & Governance	3: Risk Assessment & Management
Element:	Understanding	Policy & procedures	Relationships
	Mindsets & behaviours	Leadership & governance	Gathering & analysing safety risk data
	Competence & training	Work management & resourcing	Safety risk information assessment & management
	Learning	Performance management & review	Informed decisions to deliver safety outcomes

4.2 Each *Element* consists of a series of *Statements*, tailored to the CAA's regulatory responsibilities, structure and objectives. These *Statements* and an accompanying set of probing questions provide a mechanism to measure the CAA's current score with respect to that *Element*.

4.3 Each *Element* is rated from 1-5, as follows:



4.4 Within each level, each *Statement* is scored as follows: **(0.33)** lower end of this level and needs significant improvement to reach the next level; **(0.66)** mid-range at this level; **(0.99)** upper end of this level and potential move to the next level.

4.5 *Statement* scoring examples: **1.33:** lower end of level 1 and in need of significant improvement to reach level 2; **2.66:** middle of level 2; **3.99:** upper-end of level 3, potential move to level 4.

4.6 When all the *Statements* within a particular *Element* reach 0.99, the rating for that *Element* should be evaluated and potentially upgraded to the next level.

4.7 A *Section* can only be scored based on its lowest common denominator score - i.e. if any one *Element* remains at level 1, that *Section* will be deemed to score level 1.

4.8 As noted in paragraph 2 above, the CAA Safety Maturity Model is based on the bold transformation agenda that CAA has voluntarily set for itself. As such, the standards required to achieve each Level have been set ambitiously high so that the tool can be used to roadmap the journey that lies ahead.

5. Develop the Model (Step One):

The CAA Safety Maturity Model

Section 1: Culture and competence

Incorporating: (1) Understanding, (2) Mind-sets and behaviours, (3) Competence/training, (4) Learning

Understanding				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
The majority of staff understand and adhere to the documented safety regulation processes but their understanding of the part they must play to manage regulatory outcomes, as an integral part of their day-to-day work, is inconsistent. **[REF: RM3]**	All staff have a basic understanding of what safety regulation means for them and the organisation, but at least one employee group does not understand how they contribute to the organisation's regulatory objectives for safety. **[REF: RM3)** All employees understand the key safety regulation processes and decision-making mechanisms and how to make best use of them, but have development needs in terms of effective implementation. **[REF: CAA]**	All staff have a consistent understanding of what safety regulation means for their role and what they need to do. **[REF: RM3]** Safety regulation is genuinely acknowledged by all staff to be the mainstream business of the organisation. **[REF: CAA]** Safety regulation is always emphasised over competing priorities. **[REF: INPO]** Incentives, sanctions and rewards are aligned with safety-related policies and reinforce behaviours and outcomes that reflect the organisation's regulatory principles as the overriding priority. **[REF: IAMM & INPO]**	All staff understand the objective of the work activity, their role in the activity & their personal responsibility for successfully accomplishing the overall safety regulation objectives. **[REF: RM3 & INPO]** There is clear understanding of what 'fit for purpose' safety regulation looks like for a particular work area/piece of work, informed by an assessment of complexity/difficulty of the work. **[REF: INPO]** Safety regulation is regarded as a collective responsibility - every employee, from the Board to the individual contributor, has an obligation to ensure safety first. **[REF: INPO]** Leaders are commonly seen in all areas of the CAA observing, coaching & reinforcing standards & expectations. Leaders set an example for safety. Corporate policies emphasise the overriding importance of safety. **[REF: INPO]** Senior managers are the leading advocates of safety & demonstrate their commitment both in word & action. The safety message is communicated frequently & consistently, occasionally as a stand-alone theme. **[REF: INPO]**	Leaders use formal and informal communication to continuously convey the importance of safety regulation. The flow of information up the organisation is considered to be as important as the flow of information down the organisation. **[REF: INPO]** Leaders share information on a wide range of safety issues with individuals at all levels in the organisation, and periodically verify their understanding of the information. **[REF: INPO]** A growing and continuously improving informal network of experts and safety regulation champions support individuals and teams to improve their performance as part of their day-to-day work. **[REF: CAA]**

Mind-Sets & Behaviours				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Safety-related work is initiated and driven by specialists. **[REF: INPO]** The majority of staff exhibit reactive (rather than proactive) behaviours towards safety matters. **[REF: INPO]** Staff have personal objectives relating to safety. **[REF: INPO]** Policies and procedures exist that give individuals the right and responsibility to raise safety-related concerns but actual use is patchy. **[REF: CAA]**	Individuals across the organisation understand and demonstrate personal responsibility for delivering effective safety regulation. **[REF: INPO]** Staff take ownership for the preparation and execution of assigned work activities and exhibit behaviours and work practices that support effective safety regulation. **[REF: CAA]** There is evidence of personal objectives for safety, and of proactive behaviours being recognised. **[REF: INPO]** The organisation implements a process for raising and resolving concerns that is independent of line management influence. **[REF: CAA]** Safety-related concerns may be raised in confidence and are resolved in a timely and effective manner. Individuals understand their personal responsibility to raise safety-related concerns, including those identified by others. **[REF: INPO]**	Individuals across the organisation apply safety standards consistently. **[REF: INPO]** All staff have personal objectives for safety that are reviewed, and proactive behaviours are recognised. **[REF: INPO]** Employee progression and promotion is based on documented performance measurement and assessment. **[REF: INPO]** Safety-related policies and procedures are consistently applied across the organisation. The processes and tools that support effective safety regulation are the same across all the capability teams. **[REF: RM3 & INPO]** Colleague engagement survey and/or other survey method indicates that the vast majority of staff feel free to raise safety related concerns without fear of retaliation, intimidation, harassment or discrimination. **[REF: INPO]**	All staff are guided by a common code of professional conduct & beliefs. **[REF: RM3 & INPO]** Individuals hold themselves personally accountable for modelling behaviours which prioritise safety. Individuals encourage each other to adhere to the highest standards. **[REF: INPO]** Incentives, sanctions and rewards are aligned with safety-related policies and reinforce behaviours and outcomes that reflect safety as the overriding priority. **[REF: INPO]** Safety-related behaviours are rewarded in recognitions schemes. **[REF: CAA]** Individuals make well-reasoned, evidence-based decisions, do not make hasty assumptions and consider the implications of decisions and actions. **[REF: INPO]** Staff feel free to raise safety-related concerns without fear of retribution, with confidence that their concerns will be considered & feedback offered. Individuals are encouraged to voice concerns, provide suggestions & raise questions. Differing opinions are respected. **[REF: INPO]** The health of the organisation's safety culture is measured frequently with a focus on trends & qualitative data rather than absolute values. **[REF: CAA]**	Individuals understand their responsibility to foster a professional environment, encourage teamwork & identify challenges to effective safety regulation. **[REF: INPO]** Performance management arrangements recognise proactive management of safety and risk. **[REF: CAA]** Employees show a commitment to exceeding the CAA's objectives & performance standards by following existing processes & indicating where they can be improved. **[REF: CAA]** Staff adjust flexibly to each situation, read situations & approach each one with an open mind. Individuals challenge unanticipated results, rather than rationalising them, challenge assumptions, & offer opposing views when they think something is not correct. **[REF: INPO]** Differing professional opinions are encouraged, discussed & resolved in a timely manner. **[REF: INPO]** Staff are informed of steps taken in response to their concerns. **[REF: INPO]** Staff demonstrate a strong sense of collaboration within & across professional groups & activities. **[REF: CAA]** A high level of trust is established, fostered, in part, through timely & accurate communication. **[REF: INPO]**

Competence & Training				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Staff possess a core set of technical, practical and industry knowledge. **[REF: RM3, ICAO8]** Basic training (e.g. induction) and support (e.g. mentoring) is in place but is not provided on a systematic basis. There is limited evidence of a clear approach to managing safety related competencies. **[REF: RM3]** Some individuals have a structured career plan. **[REF: CAA]** Staff may have the safety-related competencies they need, but there are no clear arrangements in place to check this. **[REF: RM3]**	Safety-related competencies are identified and a programme of targeted safety-related learning and development is instituted. Individuals, including contract workers, are adequately trained to ensure technical competency and an understanding of standards and work requirements. **[REF: RM3 & ICAO8 & IAMM]** Staff discuss career plans during performance reviews but these plans are not used to structure learning activities and are not aligned to specific competencies. **[REF: CAA]** Staff are recognised and respected by others in the profession and by the broader industry for the knowledge they hold. **[REF: INPO]**	Standardised safety-related competence-based training in available to all relevant staff. **[REF: RM3 & ICAO8 & IAMM]** Leadership and management training needs are identified and training available and utilised. **[REF: RM3]** All staff have a structured career plan outlining the progression of jobs in the organisation based on level of responsibility and pay. Career plans are used to structure learning activities and are aligned to specific competencies. **[REF: CAA]** A training and development strategy/plan for the whole organisation exists and is in use to plan training and development programmes. **[REF: IAMM]**	Learning and development is matched to the organisation's needs. **[REF: IAMM]** All staff have the opportunity to seek out and embrace formal and informal professional development opportunities. **[REF: INPO]** Competencies are proportionate to the scope and impact of the role and reflect the different levels of expertise required in different roles. **[REF: ICAO8]** Staff have an individual Development Plan to help them to organise and target their professional and personal development. **[REF: RM3]** The content and process of the training and support is continually improved. **[REF: CAA]** Training effectiveness is evaluated systematically. Accurate details of the learning and development received by all staff are collated and reported to the senior managers. **[REF: CAA]**	Safety-related competence-based training fuses aviation skills or knowledge with craft of regulation and focuses on key behaviours, such as problem solving, critical thinking and systems thinking. **[REF: CAA]** All staff have an individual development plan that starts with short-term goals and moves to mid-range and long-term goals. It specifies what individuals want to achieve, or the competencies they want to develop, with the activities that will help them get there. **[REF: CAA]** The organisation makes full use of its employees' potential and actively involves them through shared values and a culture of trust, openness and empowerment. **[REF: RM3]**

Learning				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Some actions are taken, based on identification of issues and problems. **[REF: CAA]** Professional development and learning from experience (e.g. shared learning from networking; reading about new technologies, legislative changes; shadowing or assisting an experienced colleague; coaching and mentoring) may occur but it is sporadic. **[REF: INPO & WANO]** Learning is captured, but not always disseminated and acted upon. **[REF: RM3]**	Identification and resolution of a broad spectrum of problems, including organisational issues, are used to strengthen safety regulation and improve performance. **[REF: INPO]** Issues potentially impacting safety regulation are promptly identified, fully evaluated and promptly addressed and corrected commensurate with their significance. **[REF: INPO]** Staff engage in continuing professional development activities but it is not recorded or reflected on, or integrated with their learning and development needs. **[REF: CAA]** The knowledge/intelligence of staff is gained through interactions with industry. **[REF: INPO]** Opportunities exist for staff to meet, network with and learn from others undertaking similar tasks, but this is not managed systematically. **[REF: CAA]**	The organisation systematically and effectively collects, evaluates and implements relevant learning from experience in a timely manner. **[REF: RM3 & INPO]** The organisation ensures knowledge transfer to maintain a knowledgeable, technically competent workforce and instils safety values. **[REF: CAA]** An organisation-wide structured process exists for tracking and documenting the skills, knowledge and experience that people gain both formally and informally as they work, beyond any initial training. **[REF: INPO]** The organisation learns from other organisations to continuously improve knowledge, skills and safety performance. **[REF: INPO & WANO]** Staff are developed through various position rotations and opportunities to visit other relevant organisations to broaden their experience. **[REF: INPO]**	The organisation fosters an environment in which individuals value and seek continuous learning opportunities. **[REF: INPO]** The learning process triggers and drives local improvements e.g. accuracy of estimates, process improvements and suitability of action plans. Key identified lessons have been learned and evidence provided to prove it. **[REF: INPO]** The organisation participates in benchmarking activities with other regulators and other organisations. **[REF: INPO & WANO]** Staff are continually challenged to stay up-to-date with the latest developments in their field. **[REF: CAA]** Targeted self-assessments are performed when a more thorough understanding of an issue is required. The organisation values the insights and perspectives that assessments provide. **[REF: INPO]** Action is taken to ensure that corporate knowledge is retained. **[REF: CAA]**	The organisation uses employee involvement to gather ideas and put them into practice. **[REF: INPO]** A feedback loop exists that triggers and drives continuous improvement across all areas of the organisation. Key identified lessons have been learned and evidence provided to prove it. **[REF: INPO]** Each individual's continuing professional development is a cohesive and synergistic process, with formal training and development plans enabling people to review and reflect on any learning experiences, specify their overall career goals and understand what they need to do to achieve them. **[REF: CAA]** Self-assessments are performed at a regular frequency and provide objective, comprehensive and self-critical information that drives corrective actions. **[REF: INPO]**

Section 2: Leadership and Governance

Incorporating (1) Policy and procedure, (2) Leadership and Governance, (3) Work management and resourcing (4) Performance management & review

Policy & Procedure				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Policies and procedures are partial if they exist at all. **[REF: IAMM]** Activities being performed are not documented / recorded either in outline or in detail. **[REF: CAA]** Activities are *ad hoc*, with little communication between functions. The effectiveness of the activity is entirely dependent on individuals. **[REF: CAA]** There is inconsistency between the documented process and the deployed process. **[REF: RM3 & INPO & WANO]**	Policies and procedures are in place for the operation and support of key activities. **[REF: INPO & WANO]** Procedures are clear and concise and contain sufficient information for users to understand and perform their activities. **[REF: INPO & WANO}** Not all activity is performed as per the documented process. **[REF: RM3, INPO & WANO]**	Comprehensive policies are in place outlining the organisation's role as a regulator. **[REF: ICAO8]** Documented processes have been reviewed and approved by the approving authority as the standard process. **[REF: ICAO8 & IAMM]** There is no inconsistency between the documented process and the deployed process. **[REF: INPO & WANO]** A process is in place for ensuring that policy and processes are being followed. **[REF: INPO & WANO]** The process is system-driven by enablers such as using enterprise resource planning or any other custom-made software. **[REF: RM3]** Changes to policy are planned and implemented systematically to improve the effectiveness of safety regulation. **[REF: INPO]** Procedures are **periodically** reviewed for technical accuracy, and lessons learned from operating experience or risk analysis are included. **[REF: CAA]** Change objectives, responsibilities, and implementation schedules are clearly communicated. **[REF: INPO]**	Policies and procedures reflect the needs of the specific work and its relative priorities for the organisation and stakeholders. **[REF: IAMM]** A process is in place for ensuring that policy and processes are being followed and that they meet desired outcomes. **[REF: IAMM]** Procedures are **continuously** reviewed for technical accuracy, and lessons learned from operating experience or risk analysis are included. **[REF: INPO & IAMM]**	All policy, procedures, documents and other work-related references are always readily accessible, authorised, clearly identified, controlled, technically accurate, and up-to-date. **[REF: INPO & WANO]** A process is in place for ensuring that policy and processes are being followed, that they meet desired outcomes and that there is a way of measuring that desired outcome. **[REF: INPO]**

Leadership & Governance				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
The Board has little understanding of its governance role in relation to safety or of its importance. **[REF: RM3]** Accountabilities and responsibilities in relation to safety regulation are unclear. **[REF: RM3]** The ExCo and Board does not address safety-related performance concerns. **[REF: RM3]** Dedicated groups do not exist to oversee safety risk analysis and decision making for regulated entities. **[REF: RM3]** Leaders do not discuss risks and exhibit reactive rather than proactive behaviours. **[REF: RM3]**	The Board recognises that safety is vital and an integral requirement of their governance role. **[REF: RM3 & IAMM]** Accountabilities and responsibilities in relation to safety regulation are clearly defined and understood and effectively implemented. **[REF: RM3 & INPO]** The ExCo and Board addresses unsatisfactory safety-related performance. **[REF: IAMM]** Dedicated groups are established to oversee safety risk analysis and decision making for regulated entities. **[REF: CAA]** Leaders (LT and senior managers) are reactive, e.g. in high-profile cases, or when prompted but there is heavy reliance on specialist support services to run risk / safety processes. **[REF: CAA]** Leaders discuss risks and safety with their team on occasion, but this practice is not consistent, proactive or regular. **[REF: CAA]**	Board members fully understand and accept their responsibility for the effective management of safety. **[REF: RM3]** A comprehensive company-wide governance framework has been approved by the Board and is implemented. **[REF: IAMM & INPO]** The Board exercise due diligence with regard to the effective discharge of the organisation's obligations in terms of safety and risk. Leaders influence and monitor safety improvement activities. **[REF: RM3]** Leaders (LT and senior managers) are proactive, searching out safety-related issues and potential problems and this is acknowledged and appreciated by staff at all levels. **[REF: INPO]**	The Board is fully aware of the total level of risk and ensures that the risks are managed effectively. **[REF: IAMM]** The Board is aware of the areas of the organisation's underperformance, vulnerability or non-compliance and remedial action is undertaken. **[REF: IAMM]** Leaders (LT and senior managers) exhibit behaviours that set the standards for safety regulation and oversight. Leaders drive, monitor and review safety improvement activities. **[REF: RM3 & INPO]** Leaders are receptive to ideas, concerns, suggestions, differing opinions and questions. Leaders actively solicit and are open to feedback and this is acknowledged and appreciated by staff at all levels. **[REF: RM3 & INPO]** Leaders drive the identification, prioritisation and management of risks and discuss these formally and informally with their team. Leaders actively seek out and appreciate being informed about bad news. **[REF: RM3 & INPO]**	Board members are proactively engaged in leading and championing safety awareness across the organisation. **[REF: INPO & IAMM]** Leaders (LT and senior managers) reinforce safety culture at every opportunity. Leaders drive continuous safety improvement. **[REF: RM3 & INPO]** Leaders are comfortable discussing safety culture within the organisation as well as with outside groups, such as other regulatory agencies. **[REF: RM3 & INPO]** Leaders are commonly seen observing, coaching, and reinforcing standards and expectations and this is acknowledged and appreciated by staff at all levels. **[REF: RM3 & INPO]**

Work Management & Resourcing				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Resources are allocated on an *ad hoc* basis, providing no consistency or pattern. **[REF: RM3]** Resourcing decisions are informed only by resource availability information. **[REF: CAA]** Staffing and resourcing are insufficient to deliver the required capacity. **[REF: RM3 & INPO]**	Controlled assignment of resources and a formal resource assignment approval process is in place. **[REF: RM3 & INPO]** Resources are allocated by means of capacity management and activity priority considerations. **[REF: RM3 & INPO]** Resources are allocated to meet priorities and to avoid overlapping or duplication of work. **[REF: CAA]**	The resource assignment approval and capacity management processes are driven by planned schedules across the organisation. **[REF: CAA]** Regulatory resources are directed proportionately to oversight activity and safety improvement projects that focus attention on areas where standards are not being upheld or there is the significant potential to enhance safety. **[REF: CAA]** Processes are in place to ensure that staffing and resourcing are sufficient. **[REF: RM3 & INPO]** Resources needed, such as personnel, are identified and integrated into business plans and are met. **[REF: INPO]** Plans are resourced and justified in terms of their cost vs the anticipated benefit. There is some evidence of responses being chosen that build options for future flexibility. **[REF: INPO]** The scope of work and/or activities are managed including complex and competing priorities, meeting deadlines and delivering agreed benefits. **[REF: CAA]**	Resources are proportionate to safety outcomes required. Resources are targeted strategically according to risk and organisational performance. **[REF: INPO]** Work schedules are tailored to needs and provide information necessary to effectively coordinate the work. Forecasting of future work requirements allows the effective deployment of resources. **[REF: RM3]** The work undertaken vs resource available is monitored to check that the forecast of work requirements was accurate. **[REF: RM3 & INPO]** The integrated schedule is periodically assessed and adjusted to resolve conflicts and reduce risk. **[REF: INPO]** Schedule changes are evaluated against pre-defined criteria with management approval. **[REF: INPO]**	Long-range plans are implemented and improved continuously to optimise availability, reliability, and operability of important activities. **[REF: INPO]** Resources are always consistently, proportionately, and efficiently allocated to the areas with greatest potential to deliver safety improvements. **[REF: INPO]**

Performance Management & Review				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Performance management focuses on the organisation's compliance with national requirements and international standards. **[REF: ICAO8]** The organisation primarily relies on external review from organisations such as ICAO and EASA to provide assurance of its effectiveness. **[REF: CAA]** There are no measures of safety performance. **[REF: CAA]** Responses to findings are often reactive and not planned as part of the organisation's own management cycle. **[REF: CAA]** Findings are not acted upon quickly or prioritised. **[REF: CAA]**	Regular technical and operational reviews are undertaken and an effective process is in place to verify that remedial work is completed in a timely manner. **[REF: INPO & IAMM]** Measures of the organisation's performance are employed and gaps are identified for remedial action, although this is not standardised. **[REF: IAMM]** External reviews are undertaken to provide an independent assessment of progress towards compliance with national requirements and international standards. **[REF: ICAO8]**	Internal audit / safety assurance reviews are co-ordinated, effective and planned and participation is high. **[REF: INPO]** The organisation collects information from its stakeholders about its own performance as part of its safety assurance approach. **[REF: INPO & IAMM]** All capability areas, activities and systems that are critical to the organisation have been subject to review on at least one occasion. **[REF: CAA]** Recommendations are actioned and progress is tracked. **[REF: INPO & IAMM]**	The organisation's practices are fully assured by an internal process. **[REF: INPO & IAMM]** There are measures that track the organisation's performance which proactively seek out new opportunities for improvement. **[REF: INPO]** There is clarity regarding tracking, and accountability to direct where senior management should/might intervene. **[REF: INPO]** The Board receive regular updates from the Leadership Team about the state of its performance with respect to its regulatory obligations for safety. **[REF: IAMM]** The organisation benchmarks itself against others. **[REF: INPO & IAMM]**	Independent assessment of the organisation's approach shows that it is aligned with the organisation's regulatory obligations and is fully compliant with national requirements and international standards. **[REF: INPO & IAMM]** The organisation is an exemplar of best practice across the sector. **[REF: CAA]** The organisation is willing to revise its performance targets to strive for further improvement. **[REF: INPO]** The organisation seeks peer review as part of its assurance approach. **[REF: INPO]**

Section 3: Risk Assessment and Management

Incorporating (1) Relationships, (2) Intelligence Gathering & Sharing, (3) Safety Risk Information Assessment & Management, (4) Informed Decisions to Deliver Safety Outcomes

Relationships				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Arrangements are in place to work with external stakeholders to achieve shared safety objectives including risk sharing/transfer, but little or no cooperation exists with regulated entities. **[REF: CAA]** Regulated entities perceive the organisation's function as 'policing'. Its safety oversight function is still perceived as little more than rule making and compliance-checking and is not seen to help entities to manage their risks. **[REF: CAA]** There is little effort to actively engage with other stakeholders such as DfT, ICAO, EASA, including regarding risk sharing, transfer etc. **[REF: CAA]**	There is regular engagement with regulated entities and other stakeholders, but this is still largely reactive and focused on reviewing what has already been done rather than forward looking. **[REF: CAA]** Some regulated entities perceive that the organisation helps them to achieve their own safety objectives. **[REF: CAA]** Parts of the organisation are regarded as credible and respected by industry and other stakeholders. **[REF: CAA]** Policies for sharing and managing information across internal boundaries are defined and implemented. **[REF: INPO]**	The organisation's engagement with regulated entities is structured and standardised and is proactive, aiming to influence their policies and processes in a proactive way and working with industry for joint safety goals. **[REF: CAA]** The vast majority of regulated entities perceive the CAA's function is important in helping them achieve their own safety objectives. **[REF: CAA]** The industry maintains its confidence in the regulatory environment and to influence safety improvements across the system. **[REF: CAA]** People work collaboratively across the capability teams & wider organisation to ensure risks are addressed & the best outcome achieved. **[REF: INPO]**	The level and nature of collaboration with regulated entities is monitored and tracked so that tangible results can be measured and trended. **[REF: CAA]** The interface with the regulated entity is managed effectively by means of regular meetings and collaboration with the entity's management on matters of risk, performance and compliance, providing feedback and monitoring actions and risks. **[REF: CAA]** Metrics on issues and problems, and their subsequent resolution, are collected and relevant information is shared with external stakeholders. **[REF: CAA]**	The organisation actively engages with its stakeholders to provide and receive accurate, timely and intelligence-led safety information. **[REF: INPO]** The organisation is seen as a leader in its approach to regulation by industry and other stakeholders. **[REF: CAA]**

Gathering & Analysing Safety Risk Data				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Risks and safety data are collected but there is little analysis and, as such, their value is not always clear. **[REF: CAA]** Information management standards and guidelines, including records and document management and mandatory training requirements are understood and complied with. **[REF: CAA]**	Risks and safety data are collected but not coordinated or shared across the organisation. **[REF: CAA]** The activities that are critically dependant on risk and safety data are known and monitored. **[REF: CAA]** The organisation responds to issues if they are identified from the data, and issues and concerns are tracked, investigated and reviewed periodically for timely resolution. **[REF: CAA]** The organisation has some understanding of the risk landscape**. [REF: CAA]**	Risks and safety data are collected, managed and shared with all relevant people and groups. **[REF: INPO]** Information collection and analysis is automated, and tools and processes are in place to reduce the load on individuals. **[REF: INPO]** The organisation uses safety data to proactively seek out internal and external issues and problems. **[REF: CAA]** Information is shared across the whole organisation, where appropriate, to enhance the collective knowledge within the organisation. **[REF: INPO]** Metrics on safety performance of entities are regularly produced, reported and shared to all relevant people. **[REF: CAA]** Issues and problems are thoroughly assessed, and corrective actions are implemented that address underlying causes. **[REF: INPO]** Safety data requirements are reviewed and understood to ensure that the organisation has the best risk picture practicable. **[REF: CAA]**	Qualitative and quantitative safety risk and safety data on the performance of regulated entities are collected, managed and shared across the organisation. **[REF: ICAO8]** Complex issues are understood and analysed, drawing on the breadth of data and information available. **[REF: INPO]** Information quality & consistency is such that inspectors & managers have the best possible information to work with & make informed decisions. **[REF: CAA]** The intelligence available is utilised to identify the risks in an operational context and the managing factors that individuals and organisations can employ to reduce these and improve safety performance. **[REF: ICAO8]** Individuals combine intelligence with personal knowledge of the entity/industry to make decisions based on both evidence & expertise. **[REF: CAA]** Metrics on the total system and entity performance, including occurrences and risks and their subsequent resolution / mitigation, are collected / analysed and this information is reported to the Board. **[REF: CAA]** Causes of problems are trended to determine if additional action is needed. Follow-up is done to determine the effectiveness of corrective actions. **[REF: INPO]**	The Organisation's safety actions are intelligence-led and involve all levels of the organisation. **[REF: CAA]** Intelligence sharing is a key priority both internally and with external stakeholders. **[REF: CAA]** The organisation's approach to intelligence gathering and sharing is continually improved to achieve the organisation's objectives in terms of risk and safety. **[REF: CAA]** Total system risks can be quantitatively ranked and prioritised. **[REF: CAA]**

Safety Risk Information Assessment & Management				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Individuals have limited ability to understand risks and how to sentence them (treat, transfer etc.) including risk threshold (appetite). **[REF: CAA]** Risk management is focused on threats only. **[REF: CAA]** There is limited management appetite to review/discuss risks. **[REF: INPO & WANO]** There is uncoordinated implementation of risk management practices, disconnected from any assessment of what is appropriate for the work. **[REF: RM3]** The organisation's approach to risk management is solely based on compliance and not the risk landscape. **[REF: CAA]** There is limited evidence of staff being encouraged to identify risks. **[REF: RM3]** There is limited evidence of lessons being learned when risks materialise. **[REF: INPO]**	There is some discussion and understanding of the approaches to help sentence risks but there is limited consideration of different priorities, or different levels of complexity or severity. **[REF: CAA]** A risk management process is followed but this is standard and/or there is poor implementation, e.g. risks not described clearly, separating causes from risk events from effects. **[REF: RM3]** A process is in place to escalate risks through the organisation's management structure for effective decision making within the organisation. **[REF: RM3 & IAMM]** Frequencies of inspections are not determined on a risk basis. **[REF: CAA]** Programmes of work are reactive, initiated in response to incidents and accidents, rather than pre-emptive (where possible). **[REF: CAA]** Staff are encouraged to identify safety risks and there is a process for doing so. **[REF: INPO]** Managers and senior leaders review and discuss safety risks but do not always take the lead, and there is no formal governance structure. **[REF: RM3]** Some lessons are learned from risks that have materialised. **[REF: INPO]**	Safety data requirements are understood & directed across CAA to provide the best risk picture possible. **[REF: CAA]** There are regular discussions on safety risks and a consistent understanding of how to sentence these. Actions to sentence risks are proportionate/ tailored, and recorded & monitored. **[REF: INPO]** Managers lead the identification, prioritisation & management of risks, and discuss these with their team. **[REF: RM3 & INPO]** There is a defined safety risk governance structure, e.g. forums, & risk review frequencies. The risk management process is applied consistently, e.g. risk assessment, articulation etc. **[REF: RM3 & INPO]** A process is in place & used by most (but not all) staff to escalate risks through the CAA's management structure for effective decision making. **[REF: RM3]** Risk management plans reflect the needs of the specific work & its relative priority for the CAA & entity. **[REF: CAA]** Trends (social, economic, political, technological, environmental & sectoral) are used to anticipate threats & taken into consideration in regulatory decision making. **[REF: CAA]** Lessons are learned & acted upon when risks materialise. **[REF: INPO]**	Objective governance processes are in place to challenge perspectives, approaches and decisions relating to safety risks. **[REF: INPO]** An overall performance view of the regulated entity is taken into consideration based on a number of data sources and views from the team overseeing the organisation. **[REF: CAA]** Oversight is varied in response to risk and complexity assessments. **[REF: CAA]** Resources are allocated based on consistent and intelligent application of quantitative risk assessment. The quality of implementation can be seen to be continually improving. **[REF: CAA]** The threats, vulnerabilities, gaps and risks to the effectiveness of the organisation's safety risk management processes are kept under active review through an objective assurance process. **[REF: INPO]** The organisation can reallocate resources dynamically to respond to changing risks. **[REF: INPO]** Risks are consistently escalated (when required). **[REF: RM3 & INPO]**	Clear evidence exists that all staff understand the risks that their part of the organisation/role aims to address, and/or is exposed to, together with the most appropriate response. **[REF: INPO]** A clear understanding exists of what 'fit for purpose' risk management looks like for a particular project/piece of work, informed by an assessment of complexity/ difficulty of the work and the organisation's risk threshold (appetite). **[REF: INPO]** The organisation understands the risks that each entity faces and maintains a comprehensive risk picture at sector and total system level. **[REF: CAA]** The exposure to identified risks is within the risk threshold of the Board, its external stakeholders and those with whom it works. The threats, vulnerabilities and risks to the organisation are kept under active review. **[REF: IAMM]**

Informed Decisions to Deliver Safety Outcomes				
Level 1: Ad hoc …poorly controlled and reactive	**Level 2: Managed** …characterised for particular projects or events and is often reactive	**Level 3: Standardised** …characterised for the organisation as a whole and is often proactive	**Level 4: Quantitatively managed** …to use measures and controls	**Level 5: Optimised**…fully integrated into our processes and practices
Decisions do not explicitly consider risk and/or safety implications. **[REF: CAA]** Factors that may affect or bias safety attitude and decision-making in risky situations are not understood. **[REF: CAA]**	Specific risks (threats and opportunities) are discussed in particular meetings (e.g. risk review boards) but risk is not explicitly considered and addressed as an integral part of day-to-day decision-making. **[REF: INPO]** People have a basic understanding of the factors that potentially bias risk attitude and decision-making. **[REF: CAA]**	All decisions explicitly address specific risks (threats and opportunities) and the overall 'uncertainty' of the activity. **[REF: INPO]** There is a good understanding of the factors that potentially bias risk attitude and decision-making. **[REF: CAA]** Escalation and communication ensures that risks are reviewed at the right level/forum. **[REF: INPO]** Individuals use decision-making practices that emphasise prudent choices over those that are simply allowable. **[REF: INPO]**	Decision making is based upon intelligence generated by the quantitative data that it collects. Timely decisions are based on evidence. **[REF: CAA]** The commercial and financial pressures placed upon the regulated entities are understood to effectively influence the desired safety outcome. **[REF: CAA]** Processes are in place to challenge potential bias and ensure quality decision-making. Decisions are challenged and scrutinised to ensure effectiveness. **[REF: INPO]** Scenario planning is used to explore options at critical decision-points and alternative solutions are understood and assessed to achieve the best outcome for both the organisation and the stakeholder. **[REF: INPO]** The organisation has established a well-defined safety decision-making process, with variations allowed for the complexity of the issue being decided. **[REF: INPO]** People consider long-term consequences when determining how to resolve emergent concerns. **[REF: INPO]** People take timely action to address unsafe conditions, commensurate with their safety significance. **[REF: INPO]**	Decision making is informed by high quality intelligence and consideration of risk. **[REF: INPO]** Decisions are documented, defensible and based on evidence. **[REF: INPO]** There is clear evidence that individual decision-makers, and decision-making groups are able to identify and manage the factors that bias their risk attitude and decision-making in risky situations. **[REF: CAA]** Important safety decisions are always made by the correct person at the lowest appropriate level. **[REF: CAA]**

Sources used to develop the Safety Maturity Model components:
ICAO 8 Critical Elements **[REF: ICAO8]**
CAA PROMISE Framework **[REF: CAA]**
RM3 Railway Management Maturity Model **[REF: RM3]**
The Information Assurance Maturity Model **[REF: IAMM]**
INPO (Institute of Nuclear Power Operators) Traits of a Healthy Nuclear Safety Culture **[REF: INPO]**
WANO (World Association of Nuclear Operators) Peer Review and Performance Criteria **[REF: WANO]**

6. Share & Validate the Model (Step Two):

6.1 In order to facilitate Step 2 of the Model's development (described in paragraph 2), Cranfield has utilised the Review to identify areas of improvement that the CAA could take to progress against the individual components of the Model. The CAA is part-way through Step 2, and Cranfield's view is that focus should be on sharing and validating the Model. Cranfield has therefore not sought to score the CAA against the Model; the objective is to enable the Board to agree targets for improvement (thus completing Step 2), and to provide further analysis of the Review findings and recommendations.

6.2 The identified 'areas of improvement' are based on evidence from colleague interviews and the review of documents, applications and other material. Full details are provided below, including Recommendations as agreed with the CAA.

Culture & Competence

Understanding	
Probing Questions	**Evidence & Assessment**
1 Do staff across CAA have a shared understanding of safety regulation & how it should be assured? **2** Do staff have a consistent understanding of what safety regulation means for their role & what they need to do? **3** Is safety regulation perceived to be a specialised & technical subject or is it genuinely acknowledged to be part of mainstream business? **4** Are incentives, sanctions & rewards aligned with safety-related policies and reinforce behaviours & outcomes that reflect the organisation's regulatory principles as the overriding priority? How effective are they? **5** Do leaders throughout the CAA set an example for safety regulation? **6** Do corporate policies emphasise the overriding importance of safety as one of the regulatory principles? **7** Is the safety message communicated frequently & consistently? How effective is it? **8** Do leaders throughout the CAA set an example for safety regulation? **9** Do corporate policies emphasise the overriding importance of safety? **10** Are Executive & senior managers the leading advocates of safety? Do they demonstrate their commitment both in word and action?	• Interviewees revealed that the need for change within CAA (e.g. TP, PBO) was not well understood but staff are now buying-in to the concept of adding-value above compliance. • Staff have a basic understanding of the importance of safety regulation but there are many differing opinions about what safety assurance means for them. • Some employees feel that their contribution to safety is not recognised or valued e.g. within SSC, and want to be able to add more value. • All employees understand the key safety regulation processes and decision-making mechanisms and how to make best use of them but some interviewees do not understand how they contribute to the organisation's regulatory objectives for safety, and there are development needs in terms of effective implementation. • Accountability is not fully recognised across the organisation although there is clear management commitment to changing this.

Recommendations:

An ongoing comms strategy highlighting the need for change & the differing change processes should be implemented **[REC 55]**.

A specific PBO development programme should be implemented **[REC 40]**.

The recognition system should be revised to enable direct reward for contribution to safety **[REC 56]**.

The Safety Accountability programme should include accountability at all levels of the organisation. This should be linked to personal objectives **[REC 57]**.

LT objectives should include targets for the observation, coaching & reinforcement of standards & expectations **[REC 58]**.

Mind-Sets & Behaviours	
Probing Questions	**Evidence & Assessment**
1 Do individuals across the organisation understand and demonstrate personal responsibility for effective safety regulation? **2** Are personal objectives for safety and proactive behaviours being recognised? How effective are they in driving the right safety-related behaviours? **3** Is there a description of what is deemed to be unacceptable behaviour? **4** Do policies and processes reflect the organisation's safety objectives? Are they followed consistently? Are they fit for purpose? **5** Are incentives, sanctions & rewards aligned with safety policies and/or performance? How effective are they in driving the right safety behaviours? **6** Is employee progression and promotion based on documented performance measurement and assessment? Is performance in terms of safety regulation a core criterion in these discussions? **7** Do HR arrangements reward positive approaches to safety regulation and address negative activity? How effective are they in driving the right safety-related behaviours? **8** Is performance measured effectively? What rewards exist for good/excellent staff performance in the organisation? Are rewards competitive with industry? **9** Are there mechanisms that staff can use to bring concerns about risk/safety to the attention of senior management? How effective are they? **10** Is collaboration & cooperation functioning within & across professional groups & departments & operational activities? **11** Is a Just Culture policy endorsed at appropriate level? Are there legal provisions to protect self-reporting? Does the organisation actively strive to implement Just Culture provisions? How effective is it?	• Phase 1 & 2 interviews suggest that some individuals do not feel free to raise concerns without fear of retribution, or with confidence that their concerns will be addressed. • There remains a negative legacy from the 2014 Review re how negative feedback was perceived to have been received by senior management. • Engagement survey confirms the data from interviews & shows that staff concerns re the above issues increases with tenure. • The exit survey data lacks any qualitative data making the quantitative data hard to interpret. Exit interviews would supplement a survey and are something that should be considered. • Relationships (managers and colleagues) do not appear to be a factor – in fact this aspect looks to be very positive at both sites. • Approx. 20% of staff left Gatwick because of job satisfaction, but it is not clear why. • Pay & reward as a reason for leaving is relevant for London (less so at Gatwick). • The matched expectations & training scores for Gatwick are perhaps concerns – again hard to decipher the reasons why. • The Gatwick 'never felt discriminated' score is concerning, 25% saying neutral or disagree – but again it is unclear why. • Rewards for certain roles are perceived to be poorer than in industry or poorer than used to be offered within CAA. • Some employees perceive focus has been on cost and headcount reduction rather than increased efficiency or quality. They acknowledge recent improvements in this regard. • There are some good examples of different parts of the CAA working more closely together e.g. at IRMs with the facilitation of the PBO team. • The organisation is committed to building a Just Culture although this is still considered to be in its infancy in certain parts of the business.

Recommendations:

The programme already underway to address cultural issues highlighted in this Review & the colleague engagement survey should result in clear KPIs to enable continuous improvement **[REC 59]**.

The exit interview & survey process should be formalised to enable qualitative analysis of data in order to target retention issues (as required) **[REC 60]**.

Initiatives to enable consistent rewards for comparable job roles & to allow benchmarking against industry should be undertaken more frequently & be visible / accessible to colleagues **[REC 61]**.

An independent & appropriately resourced system is required to enable colleagues to raise concerns internally **[REC 62]**.

All colleagues should have individual/team-level objectives related to safety **[REC 63]**.

Competence & Training

Probing Questions	Evidence & Assessment
1 Are staff trained and competent to perform their roles? **2** Are the principles of safety regulation embedded in the training of all staff? **3** Do plans exist to introduce appropriate education and training to meet the organisation's needs? **4** How does the organisation identify, develop and utilise specific safety competencies? **5** Has a training needs analysis been undertaken to determine what education and training is needed for those who have safety responsibilities? **6** Have those who have been identified as needing the training been trained? **7** Has any analysis been undertaken to assess whether discrete safety-related training is still required, or whether the message could be better delivered by incorporating it within other training modules? **8** What training is in place to support Just Culture? **9** Is there a learning and development strategy/plan? **10** Have competency requirements changed under PBR? How are these competencies benchmarked e.g. EASA? **11** Is the competency framework being aligned to the PBO approach now in use? **12** Has anything been done to target the training to address particular parts of the business that are subject to higher risk? **13** Does a programme of targeted safety-related education and training exist for staff? **14** Is an effective process in place to select staff for further education and/or training on safety-related matters? **15** Is the effectiveness of the education and/or training measured?	• The technical knowledge & experience of CAA's management & field force has been recognised as one of its strengths & acknowledged by industry. • There is perceived loss of technical expertise. • Engagement survey suggests that employee rating of training & development has improved. • PBR requires the professionals working within regulatory authorities to possess additional social and management skills. No evidence that the development needs of frontline staff have been identified and addressed systematically. No learning needs analysis was supplied. • Safety competence profile developed for SARG, starting in 2014, benchmarked with ICAO & EASA but is not universally applied and little evidence that it currently used to inform training and development. • It has been suggested that a Leadership Competence Framework is being developed aligned with 360s & coaching for the top two tiers. However, this information was not available to review. • Competence frameworks do not appear to be fully aligned with job descriptions. • Five competency profiles exist. • Corporate values work has been undertaken but does not appear to underpin training & development. • The move to PBO requires a broadening of skills across technical & non-technical but not all staff accept the need to develop non-technical skills or are comfortable using them. • Induction training is provided to train new field force. The PBR slot is only 30 minutes. EPT is covered separately in a 2 hour workshop. • PBR field force competencies framework presented at F5 training. • Negative reactions to F5 training may indicate that the need for, and value of, training has either not been fully communicated or accepted. • Little evidence of an analysis of performance/potential and a systematic talent management process. • There is an ongoing challenge to balance experience and expertise. • Highly competent staff find they are in high demand as trainers / consultants for CAAi which takes them away from their day job.

Recommendations:

The HR team should ensure that the SARG inspectorate role-specific competency framework is used for recruitment, performance management & reward, and development discussions **[REC 33]**.

The PBR team should periodically monitor, review & update the SARG inspectorate role specific competency framework **[REC 34]**.

It is recommended that a specific PBO development programme be implemented **[REC 40]**.

The HR team should conduct a review of competency profiles **[REC 36]**.

The HR team should ensure that the Talent Development Programme & Senior Manager Programme align with the PBO competencies **[REC 64]**.

The relationship between values, competencies & recognition should be reviewed & clarity provided **[REC 65]**.

Learning	
Probing Questions	**Evidence & Assessment**
1 Are the causes of issues/ actual problems understood and acted upon? How effectively is this done? **2** Is learning captured and disseminated? How? **3** Do people engage with industry for the purpose of learning and sharing best practice? How? **4** Is the organisation benefiting from sharing and learning best practice from others, including fellow regulators, specialists and industry etc? How? **5** Do opportunities exist for people to broaden their experience and develop their knowledge and skills beyond formal training? How? **6** Is there a culture of continuous improvement? **7** What benchmarking activities are undertaken with other regulators and other organisations? **8** Are self-assessments performed? How effective are they?	• The CAA contributes to a variety of international regulatory activities through participation in multiple committees and working groups in ICAO and EASA such as leading roles in ICAO Safety Management Panel, ICAO RPAS Panel and various rulemaking groups in EASA. • The CAA actively engages with industry through a wide range of activities including helping to fund the UK Flight Safety Committee, UK Airprox Board, CHIRP and other respected bodies in addition to hosting fora (e.g. FDM forum), which all enhance intelligence gathering capabilities. • Phase 1 indicated that there had been a loss of corporate memory during TP (targeted reduction of headcount of 120 plus effect of turnover). • It was perceived that accidents do not always trigger sufficient willingness or enthusiasm to learn. • There is some nervousness about documenting deficiencies for fear of personal accountability or organisational exposure. • A willingness to learn was strongly expressed by the Board and LT. • The capacity to systematically learn from occurrences and near-misses is sporadic or limited by capability or capacity. • Airworthiness' use of 'deep-dives' were regarded as example of excellence driven by the Section Head's commitment to self-reflection and learning. • The creation of the Safety and Business Assurance Team within CAA and the commissioning of this review, clearly signal the intent of the LT to increase its safety capability.

Recommendations:

A systematic, centralised method for collecting, evaluating & implementing relevant learning from experience should be implemented **[REC 66]**.

Collaborative benchmarking & peer review initiatives with external organisations should be implemented as a systematic & ongoing process coordinated by the S&BA team **[REC 67]**.

Performance Management Reviews should include focus & reflection on learning experiences **[REC 68]**.

The Case Studies methodology should be implemented as an ongoing, regular Safety Assurance team activity **[REC 69]**.

Leadership & Governance

Policy & Procedures	
Probing Questions	**Evidence & Assessment**
1 Are policies and procedures in place for core processes? How effective are they? **2** Are procedures clear and concise? Do they contain sufficient information for users to understand and perform their activities? **3** Are activities being performed documented / recorded either in outline or in detail? **4** Do people follow the documented process? **5** Are documented processes reviewed & approved as the standard process? How effective is this process? **6** Are processes system-driven by enablers such as using enterprise resource planning or any other custom-made software? How effective are they? **7** Are procedures reviewed? What factors are considered? How effective is this review? **8** Are changes to policy planned and implemented systematically to improve the effectiveness of safety regulation? How effectively is this change managed?	• Interviews in Phase 1 and Phase 2 suggest that risk management, safety policies and processes in certain areas are deficient. (See Appendix 1, paras 7.1-7.23. • Several interviewees during both Phase 1 & 2 interviews commented on the fact that CAA's internal procedures are not always up-to-date. • It was recognised / stated by many interviewees (during Phase 1 and Phase 2) that the change management process is not consistent and effective across the entire organisation despite the fact that various projects are managed with the engagement of all stakeholders involved. • There are examples of activities that are aimed at improving processes such as through recording decision making, and the undertaking of regular reviews.

Recommendations:

Policies & processes should be coordinated centrally and regular, independent scrutiny applied to identify any localised procedures that need to be centralised **[REC 70]**.

Differences between the change management processes documented in the RSMS, CAA management system & COO should be removed & clarity provided regarding the relevant processes **[REC 15]**.

Leadership & Governance	
Probing Questions	**Evidence & Assessment**
1 Does the Board understand its governance responsibilities in relation to safety? How effectively does it execute them? **2** Do Board members & leaders understand their safety accountabilities? How effectively do they ensure they are discharged? **3** Do governance arrangements explicitly address risk and/or safety? **4** Does the Board address safety-related performance concerns? How effectively does it address them? **5** Do dedicated groups exist to oversee safety risk analysis and decision making for regulated entities? How effective are they? **6** Do leaders discuss risks and exhibit reactive or proactive behaviours? **7** Do leaders demonstrate their commitment to Just Culture in a way that staff can have confidence in? **8** Do leaders exhibit behaviours that set the standard for safety? Are they reactive or proactive? Do they reinforce expected behaviours verbally and in their actions? **9** Are leaders receptive to ideas, concerns, suggestions, differing opinions and questions? Do leaders actively solicit and are they open to feedback?	• Over the last 2-3 years, the Board has been seen to be much more involved in safety than previously. • Of the three Non-Executive Directors (NEDs) interviewed, all expressed interest in adding value to the safety discussion, particularly in terms of offering a fresh perspective on matters of safety. All expressed strong confidence in the CEO and Director, SARG. • Some staff greatly appreciate the efforts of the LT & Board to be more visible to staff although they do not always feel confident to engage openly with them. • There is a perception of disconnect between the LT & field force. • Some anecdotal evidence that leadership visits to work areas appeared to have been 'staged'. • Leaders (not just LT but all senior managers) are not perceived to be receptive to ideas, concerns, suggestions, differing opinions and questions. • Leaders are considered to act decisively and swiftly in response to events.

Recommendations:

A process for highlighting to the Board at regular intervals the total level of risk should be implemented **[REC 71]**.

Delivery Ethos & mind-sets & behaviours work should include focus on increasing leadership visibility / accessibility from Board level down to middle-management **[REC 72]**.

A comms strategy to communicate decisive action / activity undertaken as a direct result of risks being escalated to the leadership team(s) should be implemented **[REC 73]**.

Work Management & Resourcing

Probing Questions	Evidence & Assessment
1 Are resources approved and allocated effectively? How is this achieved? **2** Is staffing and resourcing sufficient to deliver the required capacity? **3** Are future work requirements forecasted to allow the effective deployment of resources? Are forecasts monitored? **4** Are the resource assignment approval and capacity management processes driven by planned schedules? How effective are they? **5** Are resources needed, such as personnel, identified and integrated into business plans? Are they met? How effective do these plans justify the resources required? **6** How are tasks prioritised so that resourcing is sufficient to deliver the required outcomes?	• During Phase 2 interviews, several interviewees stated that resource planning is not consistent and structured across the organisation. For example, some capability areas are much better than others. It was highlighted that some departments are resourced continuously under their budgets. • Resource constraints have been consistently mentioned by many interviewees (both Phase 1 & 2). It is recognised that current resources are just enough to manage the demands but it has been highlighted that the CAA is always striving for continuous improvement and that resources are required to achieve the CAA's aspirations to be/remain a leading regulator. • Many recognise the challenge of attracting high quality staff in competition with industry. • There is evidence of a concerted management effort to better plan resourcing across the CAA although the capacity to deal with unexpected 'pop-ups' has been limited.

Performance Management & Review

Probing Questions	Evidence & Assessment
1 Are internal & external reviews undertaken to provide an independent assessment of progress? How regularly? How effective are they in ensuring compliance? Have all capability areas been subject to review? **2** Are there measures of safety performance? Are gaps identified for remedial action? Are the measures standardised and used consistently? **3** Does the organisation collect information from its stakeholders about its own performance as part of its safety assurance approach? **4** Are findings acted upon quickly or prioritised? How effectively are they acted on? **5** Does the organisation benchmark itself against others? How effective is this?	• Level 3 would be attained if a review of each capability area was undertaken and information collected from stakeholders about the CAA's own performance as part of its safety assurance approach. • The safety assurance review is a good example of the LTs desire to review its performance and establish an enduring methodology for the future. • There is an enthusiasm to benchmark the organisation, but its pioneering position in terms of PBR makes it difficult to know who to benchmark against. • Feedback from stakeholders is sought e.g. through PBR Implementation Group, Performance Based Regulation: Business Engagement Assessment (CAP 1345).

Recommendations:

Resource planning & resource prioritisation work should be communicated more frequently and widely across the CAA **[REC 74]**.

Backwards-looking review of resource planning, prioritisation & recruitment should be undertaken at regular intervals to enable continuous process improvement, particularly to ensure proportionate & efficient allocation of resource in future **[REC 75]**.

Assessment of the maturity of each capability area against the SMM (facilitated by S&BA), & independent verification of this maturity should be undertaken, with targets for improvement agreed & identified **[REC 76]**.

Risk Assessment & Management

Relationships	
Probing Questions	**Evidence & Assessment**
1 Are arrangements in place to work with external stakeholders to achieve shared safety objectives? How cooperative is the relationship with regulated entities? **2** Do regulated entities perceive that the CAA helps them to achieve their own safety objectives? How do regulated entities perceive the CAA's function? **3** Are parts or the whole CAA regarded as credible & respected by industry & other stakeholders? **4** Are policies for sharing and managing information in relation to risk (including risk transference) across internal boundaries defined and implemented? **5** Is the interface with the regulated entity managed effectively? How is this achieved? Is it measured? Are agreed actions (with entities) to manage risks monitored/measured? **6** Is the CAA seen as a leader in its approach to Better Regulation by industry & other stakeholders? **7** Does the organisation work collaboratively across capability teams?	• Safety objectives are set by CAA & based on objectives from ICAO and EASA, in line with the European Plan for Aviation Safety. • There are defined policies & procedures for sharing & managing information relating to risk. Some of these processes could be simplified. • Currently there is no policy which restricts inspectors/ oversight managers to be responsible for an entity for a specific period of time. Potential concerns (i.e. CAA personnel being too close to the organisation/normalising risk) were discussed during interviews & workshops. CAA's relationship with large & complex entities was raised as both examples of good collaboration & an area of concern. • Certain types of safety data, which seem to be related to one specific capability area, may require risk assessments to be carried out by other capability areas and trigger further data analysis. E.g. currently there are mid-air conflict risks documented in AAA and AW areas but not in FO. • There are good examples of collaboration between capability teams.

Recommendations:

A systemised process for monitoring & tracking the level of collaboration with regulated entities should be implemented & periodically subjected to independent review from the S&BA team **[REC 77]**.

An ExCo approved & systemised process for regularly rotating inspectors / Oversight Managers should be implemented to mitigate the risk of regulatory capture **[REC 78]**.

Independent scrutiny of the CAA relationship with large & complex entities should form part of the Safety Assurance team's ongoing programme of reviews **[REC 79]**.

Gathering & Analysing Safety Risk Data	
Probing Questions	**Evidence & Assessment**
1 Is risk & safety data collected? Is it analysed? Is the value always clear? Is it shared with relevant individuals and groups? **2** Does the CAA respond to risks/issues identified from data? How effective is this? **3** Does the CAA use safety data to proactively seek out internal/external risks, issues & problems? How effective is this? **4** Are metrics on safety performance of entities regularly produced, reported and shared to all relevant people? **5** Are risks, issues & problems thoroughly assessed, and corrective actions implemented that address underlying causes? **6** Is information quality & consistency such that inspectors & managers can make informed decisions? **7** Do individuals combine intelligence with personal knowledge of the regulated entity & industry to make decisions based on both evidence & expertise? **8** Are metrics on total system & entity performance, including occurrences/risks & their subsequent resolution/mitigation, collected & analysed? Is this reported to the Board? **9** Are causes of problems trended to determine if additional action is needed? **10** Is follow-up performed to determine effectiveness of corrective actions? **11** Is the CAA's approach to intelligence gathering & sharing continually improving? **12** Are safety intelligence systems effective & gaps in intelligence sources identified & addressed?	• There are published processes for the collection of risk and safety data, but it is not always clear how these are analysed. Many MORs are closed on receipt & amongst them are MORs such as 'Altitude busts'. It could not be established how such MORs with reasonably significant risk are further investigated and/or trend analysis carried out. An "end-to-end MOR Review" is being conducted by the CAA. • Information collection & analysis is not automated & information is not shared with all relevant people • Safety data is used extensively in IRMs, although prioritisation could be improved. The number of incidents is reported, but not necessarily ranked by criticality. • Use of EPT has done much to enhance the quality & consistency of information. • At IRMs, individuals combine intelligence with personal knowledge of the entity by using a question set to help "rank" the latter based on the size & complexity • The presence of the PBR team at all IRMs helps to ensure consistency. • All IRMs feature a review of previous actions to monitor their effectiveness. • More could be done to trend data; for example it would appear that Q-Pulse is difficult to interrogate for Findings which have been Closed. • Some CTs carry out extensive analysis of Q-Pulse data so that they can focus on key risk areas E.g. AW conducted Q-Pulse data analysis, identified trends in surveyor behaviour & subsequently focused on targeted oversight of the 'planning' function in certain CAMOs & maintenance organisations.

Recommendations:

The MOR review should include scrutiny of the decision making process re what MORs are closed on receipt **[REC 80]**.

A centralised system for recording, tracking & sharing safety risks should be implemented **[REC 81]**.

The attendance of an independent peer-reviewer at IRMs (currently a PBR rep) should be continued **[REC 82]**.

Q-Pulse data should be systematically reviewed & analysed by all capability areas in order to enable a focus on key risk areas **[REC 83]**.

Safety Risk Information Assessment & Management	
Probing Questions	**Evidence & Assessment**
1 Do staff understand how to sentence a risk (treat, transfer, etc.) including what is/is not tolerable? **2** Is risk management focused on threats or also opportunities? **3** Do staff challenge perspectives, approaches & decisions re risk tolerance, assessment & sentencing? **4** Is a risk management process followed? Is it standardised? How effective is it? Does the approach vary depending on different priorities or different levels of complexity of each activity performed? Is oversight varied in response to risk & complexity assessments? Are resources allocated based on consistent & intelligent application of quantitative risk assessment? Can the quality of implementation be seen to be continually improving? **5** Is a process in place to escalate risks through the management structure? Is this applied? Does this enable effective decision making? **6** Are frequent inspections undertaken? Are these specified on a risk basis? **7** Do managers lead the identification, prioritisation & management of risks? Do they discuss these formally & informally with their team? **8** Are trends used to anticipate threats that could potentially impact stakeholders? Are these taken in to consideration in the regulatory decision making process? **9** Does the CAA have an overall performance view of regulated entities? Is this based on a number of data sources & views from the team overseeing the entity? **10** Does the CAA understand the risks that each entity faces & maintain a comprehensive risk picture at sector & total system level? **11** Is there a defined safety risk governance process e.g. forums, frequency of risk reviews, senior level challenge? **12** Are lessons learned from risks that have materialised?	• CAA has made significant improvements here but is not a 3 yet as there is a lack of consistency. There is a big quick win here to drive better RSMS. • Many interviewees stated that the flow of information & data management has improved, enabling more evidence-based decisions. • The role of the PBR team as an independent function is increasingly valued, in particular in terms of the quality of risk conversations taking place at IRM meetings. • A standard risk management process is followed, although it may be adapted according to the sector e.g. GA is assessed across the entire sector rather than by individual entity; certain entities in AW (based on their size & complexity) are subject to IRM process; the rest of the entities (relatively high number but smaller & non-complex) are subject to a sector IRM. • A process exists to escalate risk through the organisation, from IRM, to Safety Risk Panel, Safety Review Committee and Safety Leadership Group • Inspections of an entity are taken on a demonstrable risk basis, and this is discussed at the IRM, and based on information from the Entity Performance Tool • There is evidence that Oversight Managers play a large role in the identification, prioritisation and management of risks. This is demonstrated at each of the IRMs and in follow-up activities. • The organisation has an overall performance view of regulated entities, but this could be enhanced by including information on financial performance. Some capability areas already do this informally. • There is one view of the risks that each entity faces, condensed into a “Top Five” list of risks. These are identified at each IRM, and used as a basis for the Accountable Manager meeting. • The overall risk picture is partly shown by a heat map, which shows risks and barriers in matrix form. However, this is a non-standard presentation of data which does not allow total risk to be estimated. • There is evidence of lessons being learned from accidents and near-miss events.

Recommendations:

The risk assessment & management processes should be reviewed & revised to eradicate the multiple versions currently in place (PBO, EPT, RSMS & risk management framework are currently all different) **[REC 84]**.

Future field-force development should include focus on the important role the Oversight Manager plays in identifying, prioritising & managing risks **[REC 85]**.

Future development of the RSMS should include focus on embedding the safety risk escalation process at all levels of the organisation **[REC 86]**.

Informed Decisions to Deliver Safety Outcomes	
Probing Questions	**Evidence & Assessment**
1 Do decisions explicitly consider risk and/or safety? **2** Are the factors that potentially bias safety attitude and decision-making in risky situations understood? **3** Are specific risks (threats and opportunities) explicitly addressed as an integral part of day-to-day decision-making? **4** Is a process in place to escalate decisions through the organisation's management structure for effective decision making? Does this escalation and communication ensure that risks are reviewed at the right level/forum? How effective is decision making? **5** Is a well-defined decision-making process in place, with variations that allow for the complexity of the issue being decided? **6** Is scenario planning used to explore options at critical decision-points and alternative solutions understood and assessed to achieve the best outcome for both the organisation and stakeholders? **7** Are important safety decisions made by the correct person at the lowest appropriate level?	• Specific risks (threats and opportunities) are discussed in meetings (e.g. risk review boards) but risk is not explicitly considered and addressed as an integral part of day-to-day decision-making. • People have a basic understanding of the factors that potentially bias risk attitude and decision-making. • Specific risks (threats) are addressed but cannot always be traced to the day-to-day decision-making. New risks may be identified from Q-Pulse, EPT or using the safety risk proforma. • There is limited visibility of the identification and management of specific risks (opportunities). • The process of analysis and sentencing is not always clear, and the use of the CAA-bespoke risk matrix does not allow comparison with an entity evaluation of the same hazard. • Certain parts of the organisation do not understand the implications of their decisions in terms of the overall risk picture.

Recommendations:

Future safety assurance reviews should include sampling of escalated risks, the actions & decisions identified to address these risks & any subsequent closure/amendment of the risk **[REC 87]**.

Future development of the RSMS process should include implementation of a robust system for providing feedback to the organisation regarding the identification, prioritisation & management of risks, and any resultant decisions/actions **[REC 88]**.

7. Share the Model (Step Five):

7.1 In order to facilitate Step 5 of the Model's development (described in paragraph 2), Cranfield was asked to identify organisations that could be approached as examples of best practice, in particular with respect to those areas identified within the benchmark assessment of SARG as requiring improvement. This was to include organisations from both within and outside the aviation industry.

7.2 A summary of Cranfield's response is provided below. The full response is detailed in Appendix SMM01. The Safety Assurance Review Working Group has commenced the process of approaching and collaborating with these organisations.

Organisation:	Key Points / Suggested Collaboration:
Transport Canada Civil Aviation	• Sharing of the Safety Maturity Model concept. • Peer-to-peer benchmarking.
Australian Civil Aviation Safety Authority	• Good comparison based on its open culture. • Strong embracing of SMS. • Recent progress re regulatory reform.
Safety Management International Collaboration Group (SM ICG)	• Greater engagement to enlist a wider group of aviation safety regulators to participate in a full-scale benchmarking exercise.
EASA	• Appear to show strength around the 4 Elements of Section 3 of the Model.
Finnish Transport Safety Agency (Trafi)	• Committed to a 'risk-guided approach'. • Recently introduced the FASP process - the operating model for safety management in Finnish aviation - tools for generating a comprehensive national risk picture. • A non-aviation safety related perspective.
Military Aviation Authority	• High regard towards being a learning organisation & in looking for best practice. • Appears to be particularly strong across most elements of the Model.
Shell Aircraft	• A non-regulator doing what is effectively a regulatory function. • Stand out as being proactive & enlightened in their approach. • Deeply embedded corporate safety culture. • Would likely score highly across the full Model especially in 'Relationships' & 'Safety risk information assessment & management'.
Office of Rail & Road (ORR) and Health & Safety Laboratory (HSL)	• Developed a Risk Management Maturity Model, as a means of assessing entities within the rail industry. Since 2014 it has been co-developed with the HSL. A version called RM3-R for Regulators is used by the European Union Agency for Railways. Suggestion is to work with ORR on a common model for addressing the maturity level of their respective functions.
World Association of Nuclear Operators (WANO)	• Approach to safety extremely mature, especially in terms of its approach to peer-review as a form of continuous improvement. • Would show particularly strong performance around 'Mindset & behaviours', 'Competence & training' and 'Learning'.

Appendix SMM01
Best Practice Organisations

A1. Caveat:

1.1 There are few Aviation Safety Regulators that appear to make for good comparison. The main reason is that the CAA Safety Maturity Model is based on the bold transformation agenda that CAA has voluntarily set for itself. I.e. if a maturity model were built solely around the traditional interpretation of a Regulator's role then we may expect the CAA to score much more highly. Instead we've set the standards ambitiously high so that the tool can be used to roadmap the journey that lies ahead.

1.2 The second factor at play is that, to be a reasonable comparison, both organisations need to be willing to share information. In the case of the CAA it is unlikely that it would want to share our view of its current position with others at this stage. Similarly if we tried to score many other regulators it is likely they would also be unwilling to share their score.

A2. Organisations Identified:

Transport Canada Civil Aviation (TCCA)

2.1 It was clear from the conversations and exchanges we have had that TCCA would be interested in engaging in sharing the maturity model concept and possibly doing some peer-to-peer benchmarking.

2.2 Although they had a set-back in their evolution over the last decade or so when they got the balance wrong between entity and regulator, they have done a lot since to ensure the changes in processes and procedures. Much of what TCCA did in the past was published openly, but in recent years they have gone away from this, but are willing to share it with CAA.

2.3 Another slight challenge is that they moved on from talking about Safety Management separately from Management and hence tend to speak of Quality Assurance in the context of an Integrated Management System rather than Safety Assurance and a Regulatory SMS.

2.4 TCCA appears to show strength in the 4 Elements of Section 3 and in the 'performance management and review', 'leadership and governance' and ' policy and procedure' Elements of Section 2.

Australian Civil Aviation Safety Authority (CASA)

2.5 CASA is a good comparison based on its naturally more open culture (like the Canadians) and how strongly it has embraced SMS and more recently its progress in terms of regulatory reform. They are not without their problems and they seem to have been going through a change programme for at least 20 years, but they would be a good comparison.

2.6 CASA appear to show strong performance in the ‘competence & training’ and ‘learning’ Elements of Section 1 as well as the ‘relationships’ and ‘gathering and analysing safety risk data’ Elements of Section 3.

Safety Management International Collaboration Group (SM ICG)
http://www.skybrary.aero/index.php/Safety_Management_International_Collaboration_Group

2.7 The SM ICG met in Gatwick in May and is made up of 18 regulatory bodies including CAA - Simon Roberts is the point of contact.

2.8 The SM ICG would seem a good group to engage with more fully if a wider group of aviation safety regulators could be enlisted to participate in a full-scale benchmarking exercise. To date their focus appears to have been on the performance of entities and service providers rather than their own development, but this may be an opportunity that at least some of the membership would take up. Furthermore, the SM ICG is in the process of developing a maturity model for regulators; comparison (and potentially future alignment) with the CAA Safety Maturity Model is recommended.

EASA

2.9 Although at the supra-state level, EASA is a very logical comparator especially as it complements many of CAA’s regulatory activities. The safety assurance maturity traits in the CAA Safety Maturity Model are transferrable to regulatory functions that are delivered at European level - in other words ‘like-for-like’ functions are not necessary for useful benchmarking to take place.

2.10 EASA appears to show strength around the 4 Elements of Section 3 and ‘policy and procedure'.

Finnish Transport Safety Agency (Trafi)

2.11 As a multimodal regulator, Trafi committed to what it describes as a 'risk-guided approach'. It is a relatively new agency founded in 2010 and which has set itself the target of building the processes to guide all of its activities based on risk.

2.12 Trafi recently introduced the FASP process - the operating model for safety management in Finnish aviation (Autumn 2016) which provides tools for generating a comprehensive national risk picture - the aim is for this to be completed by the end of 2017:
https://www.trafi.fi/filebank/a/1494602768/ba0e52f6abdd0d29b3f7ae3962d8d637/25228-Finnish_Aviation_Safety_Programme_2017.pdf

2.13 Whilst Trafi do not seem to be especially sophisticated in terms of internal safety assurance, it seems to be making relative swift progress towards its ambition. It appears to be a good organisation to compare with and to bring in a non-aviation perspective.

2.14 From our initial observations, Trafi is likely to show strength around ‘policy and procedure’, ‘gathering and analysing safety risk’, ’safety risk information assessment and management’ and ‘informed decisions to deliver safety outcomes’.

2.15 See also:
https://www.trafi.fi/filebank/a/1434456797/19018fa995da55930a03c3af8bc4f1ed/17872-Nisula_From_Safety_Indicators_to_Measuring_Risk.pdf

Military Aviation Authority (MAA)

2.16 The MAA has matured swiftly since its inception in 2010 following the Nimrod Review. As a new agency it was able to seek out best practice from civilian and military environments and build a fresh organisation largely unencumbered by what was before.

2.17 It defined clear regulatory principles or 'key conditions' to deliver its strategic outcomes. These are highly compatible with CAA's objectives and, to a degree, appear to have been co-created.

2.18 Whilst the MAA is very much the younger sibling of the CAA as a regulator, it benefits from having been created post-Nimrod Review to deliver some very specific cultural values in its approach. In doing so it has placed a high regard on being learning organisation and in looking for best practice from around the world.
See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/550363/MAA_Strategy.pdf

2.19 The MAA appears to be particularly strong across most Elements of the Safety Maturity Model. Note that, since 2015, the MAA has been part of the Defence Safety Authority which may allow a broader comparison as it includes nuclear safety (which is likely to be more mature).

Shell Aircraft

2.20 As a non-regulator doing what is effectively a regulatory function, Shell Aircraft stand out as being proactive and enlightened in their approach. In keeping with the deeply embedded corporate safety culture across Shell, Shell Aircraft has worked especially hard to establish clear cultural values into what it does and how it relates to the entities is exercises oversight over.

2.21 Shell Aircraft would be willing to work with CAA in this area, although they acknowledge that they have not looked at their own safety assurance much.

2.22 Shell Aircraft would likely score highly across the full spectrum especially in 'relationships' and 'safety risk information assessment and management'.

Office of Rail and Road (ORR)

2.23 The ORR developed a Risk Management Maturity Model (known as RM3) in 2011 as a means of assessing entities within the rail industry. Since 2014 it has been co-developed with the **Health and Safety Laboratory** and the latest version was published on 16th June 2017.

2.24 Whilst RM3 has been built as a tool for assessing entities rather than the regulator per se, it can apparent be used for the latter - a version called RM3-R for Regulators is used by the **European Union Agency for Railways (ERA).**

2.25 It would be very useful to work with ORR on a common model for addressing the maturity level of their respective functions. Similarly it may be valuable to work with the **Health & Safety Executive (HSE)** because of their cross-sector coverage.

World Association of Nuclear Operators (WANO)

2.26 WANO is made up of Nuclear Power Plant operators from around the world, so is not a regulatory body or formed of regulators. However their approach to safety is extremely mature, especially in terms of the approach to peer-review as a form of continuous improvement.

2.27 WANO would show particularly strong performance around 'mindset and behaviours', 'competence and training' and 'learning'.