

Risk Based Surveillance



The UK CAA journey so far...

Includes:

Implementing a Regulatory Safety Management System to enable RBS

Taking your staff with you on the journey to RBS

Regulators & industry establishing a collaborative relationship to enable RBS

Data as the key enabler of RBS



The UK has an excellent aviation safety record, with very few accidents and millions of flights, however, that doesn't show the whole picture. Behind the safety statistics are incidents, near misses and risk factors that could have developed into accidents. With the number of flights set to rise, more demand is being placed on an already busy system.

By building a picture of aviation safety performance across the total system, we can see the true extent of the risks to UK passengers and the general public. We can also make better decisions about how to ensure that the aviation industry is managing the risks effectively.

To improve what are already very high levels of safety, we needed to do something different. We knew further regulation and just doing more of the same would not have the greatest effect. We know that reacting after an incident or near miss is not the best way to prevent it happening again. The UK CAA needed to examine the causal factors more closely and transform our regulatory activities to follow a more risk based approach. We are not alone in recognising the need to change. Risk based surveillance (RBS) is central to ICAO and EASA plans.

In 2014, the UK CAA was one of the first aviation regulators to embark on a journey to become risk based and has spent the past few years building and strengthening capabilities required to do this. This has meant transformational change across our people, processes, systems and mind-set. Many of the organisations we regulate have also needed to change to some degree to get the most out of the risk based approach.

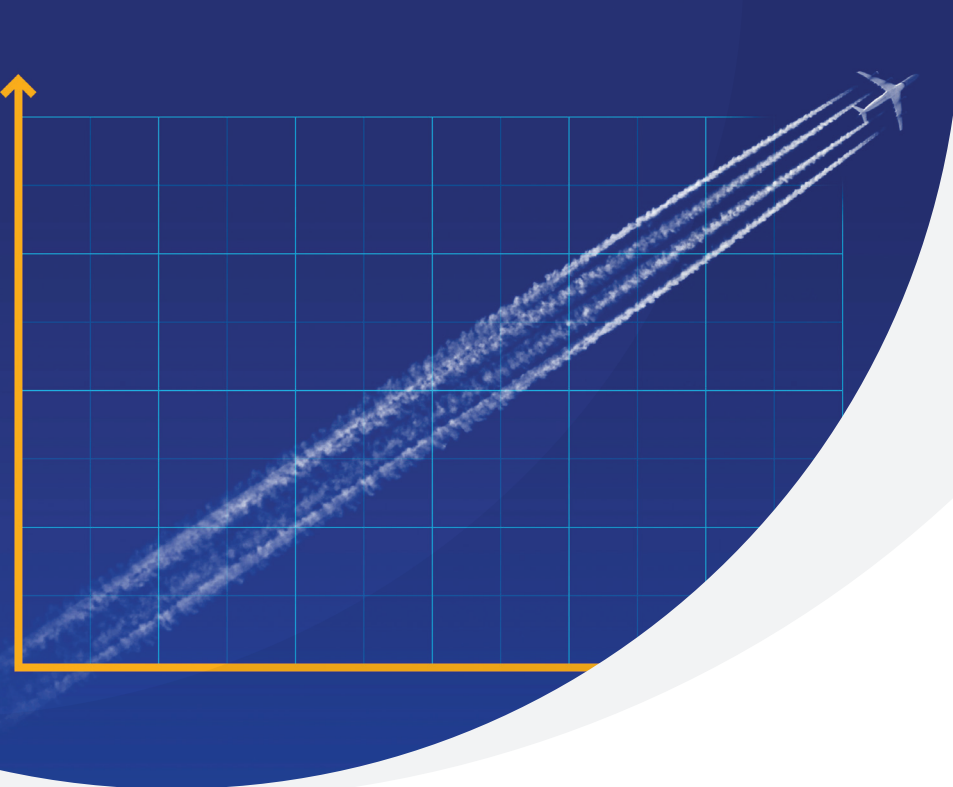
This documents contains a series of short white papers that cover four important elements that the UK CAA believes are necessary to become an effective risk based regulator ;

- Implementing a Regulatory Safety Management Systems
- Taking your staff with you
- Establishing a collaborative Regulatory/Industry relationship
- Data as a key enabler



With best regards,

Ben Alcott
International Director



Implementing a regulatory safety management system to enable Risk Based Surveillance

The concept of the Safety Management System (SMS) in aviation has gathered pace in recent years. Organisations across the industry have developed and implemented effective systems to help them proactively and systematically identify their hazards and risks and put in place measures to mitigate them.

As part of its transformation to a risk based approach to regulation, the UK Civil Aviation Authority (UK CAA) has decided to follow suit and develop its own Regulatory SMS (RSMS), one that is internal to the CAA but looks both outwardly and inwardly. There are many benefits to the regulator following a more holistic, structured and systematic approach to safety regulation.

The UK CAA's RSMS sits at the heart of its approach to Risk Based Surveillance (RBS). ICAO Annex 19, combined with the EASA Authority Requirements (ARs) for EU Member States, requires national authorities to implement their own management systems for safety regulation.

Early on in the transformation to RBS, the UK CAA recognised the need to go beyond the requirements and take a customised approach. Before embarking on the design and development of a RSMS, the UK CAA first conducted a thorough analysis of the ARs and the ICAO SMS framework. This led to the development of a bespoke framework that took the best learning from industry SMS implementation whilst also ensuring compliance with EASA requirements.

The UK CAA's RSMS consists of all the main components that you'd expect to see in an industry SMS, such as a safety policy, risk management process, safety assurance processes and tailored training programmes.

The main difference between a Regulatory SMS and the SMS of an aviation service provider is that the Regulator doesn't own the safety risk; the risk is owned by the airline, airports and other organisations. The Regulator's task is to identify where safety

The UK CAA's RSMS consists of the all of the main components and elements that you'd expect to see in an industry SMS.

challenges exist and work with the industry to help them manage their risks. This is an important distinction to make. The UK CAA's ability to act as an information and intelligence conduit allows it to develop unique perspectives on the management of safety and identify safety issues that run across different organisations and industry sectors.

One of the keys to success, for both public and private organisations, is a common understanding of what must be achieved and how. The RSMS is the common system that provides the UK CAA with a unified approach. It ensures that everybody understands their own individual roles and can communicate safety intelligence in a standardised way across professional boundaries. It brings all safety management aspects under a single system and gives

everybody the opportunity and tools to influence safety outcomes.

The Regulatory SMS works in much the same way as its industry cousin. Data is gathered from a multitude of sources – including audit findings, Mandatory Occurrence Reports (MORs) and expert knowledge of staff. It is then analysed by a dedicated team who work with technical specialists to identify aviation safety risks from the analysed data. These risks are then assessed and prioritised using a similar methodology to that used in many industry safety management systems. The risks can be escalated to an appropriate UK CAA safety management forum, where decisions can be made about how the Regulator can best influence the management of the risks.

There are various options for the UK CAA to influence safety, such as:

- Altering the focus of oversight for a whole sector of industry towards known risks,
- A safety improvement project could be commissioned, or
- New policies and guidance could be published.

Regardless of the chosen option, the RSMS ensures that activities undertaken by the Regulator are clearly defined, scoped and launched under pan-CAA governance and knowledge, with the focus being on the highest priority risks.

The greatest benefit of the UK CAA's RSMS comes from building 'pictures' of risk at various levels of the aviation system. Industry sector risk pictures and a total aviation system risk picture allows the Regulator to share safety intelligence internally and also across the industry, enabling a cross-pollination of safety risk knowledge, sharing the best ways that the Regulator has come across to mitigate the risks.

A successful transition to Risk Based Surveillance will require both the industry and the regulator to adapt to new challenges and be novel and collaborative in their joint approach to safety management. A Regulatory SMS has given the UK CAA the best opportunity to positively influence safety outcomes for UK consumers and the travelling public worldwide by systemically prioritising its resources towards the most significant safety risks.

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Taking your staff with you on the journey to Risk Based Surveillance

The introduction of ICAO Annex 19 paved the way for Risk Based Surveillance (RBS) in aviation. The new Annex describes how the regulator and industry should address safety risks proactively and introduces the concept of overall safety performance in all domains of aviation.

EASA has also made some changes to its existing rule set by introducing rules according to which the oversight programme for an organisation must be developed. These rules take into account the specific nature of the organisation, the complexity of its activities and the results of past certification and/or oversight activities. In addition to which it shall be based on the assessment of associated risks. This changing regulatory

backdrop has a significant impact on the approach and behaviours of the regulatory staff.

To make the best use of the changing regulatory backdrop and to become a Risk Based Surveillance, transformation is required on many levels. A regulator needs to work closely with industry to demonstrably reduce safety risk across the total aviation system and develop the capabilities required for future regulators to succeed in the changed environment.

The natural focus of any implementation or transformation programme is to focus on establishing the processes and the systems required. This is important, yet it is the people that will work in this new approach to regulation and they are the key to any successful transformation to RBS. They will be the ones living and breathing the newly designed processes. Therefore, ensuring that everyone understands why you are transforming and what the benefits are, is essential.

When rolling out RBS in the UK CAA, the regulator soon recognised that key to achieving its vision depended on the

investment made in their people.

The UK CAA believes that when transitioning to RBS, regulators must not underestimate the people aspect. Some of the key questions to ask are;

- Do you know what skills your new organisation will require?
- Do your staff have the skills required?
- Specifically, do they have both the hard and soft skills that will be required to deliver RBS?

Embedding RBS into any regulator's organisation relies on assuring that the staff in place has the right skills and competencies and to ensure that an organisational culture exists that supports this transformation.

A change to RBS is a very substantial change in everything a regulator does. The focus is more on having challenging risk conversations with industry rather than pure compliance checks. However, it is essential to ensure that everyone understands that compliance still remains one of the key components of safety oversight. With this in mind, the skills needed for successful RBS may be quite different from the skill set

available in the organisation. As such it is important to build on the technical and regulatory knowledge of the people in place, and move them towards a more risk based approach. This way of regulating also requires the staff to use skills such as influencing/persuasion, negotiation and financial/commercial awareness to best effect and have discussions broader than their traditional subject matter expertise.

To ensure a successful transition or implement changes on a broader scale, the UK CAA believes it is absolutely critical to achieve 'buy-in' from the start. In the UK CAA's experience, this can only be achieved through robust processes, tools and training and information/ justification for the people working in the new environment. The training must not only focus on how to use the processes and systems but should include the background of why this change is so important and how safety is improved and guaranteed throughout. An important aspect is also the practical implementation and what it means for the staff working in this new environment. To achieve 'buy-in' from regulatory staff, it is essential to be open to constructive criticism and to welcome suggestions and feedback from staff. Any such feedback, suggestions or best practice, if taken seriously, will make it easier for staff to feel part of the new approach, take some ownership and become an advocate of it early on.

To take your people on this transformation journey, it is essential to fully understand the organisational culture needed to support

the transformation to RBS. It is especially important to understand the deeper level of basic assumptions and beliefs that are shared by people within the organisation, some of which may even operate unconsciously. The organisation usually has a view of itself and its environment, which may be seen as 'taken for granted'. To take your staff with you on the journey to RBS, it is essential to understand what is seen as important by the people in your organisation and to ensure the desired outcome and the lasting success of the regulator is achieved.

By understanding what the organisational culture is currently (the 'As Is') and establishing what kind of future organisational culture would be best suited to deliver RBS (the 'To Be'), regulators will be able to actively encourage the development of this new culture. This can be achieved through targeted interventions. By clearly defining the goals from the outset, any such interventions can also be targeted and adjusted if needed. These interventions form the vehicle by which the organisation will move from the 'As is' to the 'To Be'. This allows for the right adjustments to control systems to be made as well as organisational and/or power structures

On its journey to RBS, the UK CAA has already started to put a number of interventions in place to support its staff to bridge the gap between the 'As Is' and 'To Be' positions. Some of these interventions are highlighted below:

- RBS enabling systems, tools and process

- Soft skills training and support on change resilience, matrix management and influencing
- Defining the competencies and capabilities to deliver RBS to recruit, develop and measure staff in the right way
- Updating roles and responsibilities to support delivery of RBS
- Started to define the 'As Is' and 'To Be' organisational culture in more detail to be clear on where the organisation is headed and where the gaps are to support its people.

For a successful transition to RBS, it is essential that staff are fully bought into the reasons for change and aware of how the transition will be achieved, how it will affect them and what support can be expected.

RBS aims to create better aviation regulators and in some ways, it will change the way regulatory staff assess and interact with industry. Taking your people on this journey with you is key. It is essential not to underestimate the efforts required to influence the existing organisational culture, train staff on new skills and commit to ongoing support throughout the transition.





Regulators & Industry establishing a collaborative relationship to enable Risk Based Surveillance

The relationship between the regulator and its regulated industry is always complex. After all, it is the role of a regulator to ensure that industry is adhering to agreed rules and has adequate and reliable safeguards in place. However, this somewhat simplistic reason for existence doesn't have to drive how the relationship between the regulator and industry works in practice. It is to be expected that regulators may naturally perceive themselves as different and, on occasion, separate from industry, creating a 'them and us' relationship. This directive relationship can be sub-optimal for many reasons.

On its journey to Risk Based Surveillance (RBS), the UK Civil Aviation Authority (UK CAA) learnt it is essential to rethink the relationship between industry and the

regulator. After all, it is in everyone's interest to keep aviation safe.

In 2011, the UK Government launched the 'Red Tape Challenge'; a campaign aimed at cutting unnecessary bureaucracy through the introduction of 'better regulation' principles. Combined with the requirements of ICAO's Annex 19, this built the ideal catalyst and framework for the initial step towards RBS. Both of these developments required the UK CAA to rethink its engagement with industry.

There are many different types of relationships between Industry and its Safety Regulator. These are typically described as being one of the following:

- Directive
- Engaged
- Collaborative

In a 'directive' approach, the regulator traditionally uses its power to enforce its views upon industry, resulting in a one-sided, minimalistic industry engagement. Meanwhile, in an 'engaged' relationship, the regulator may also promote industry's ability to have its own voice. Rather than just telling industry what to do, an effective regulator needs to be able to listen and consider.

To successfully implement Risk Based Surveillance, the UK CAA advocates a relationship built on collaboration.

Moving towards RBS is an evolution rather than a revolution. It is essential that all stakeholders and participants are fully bought-in to the concept.

However, to successfully implement RBS, the UK CAA advocates a relationship built on 'collaboration', which, in addition to listening to industry also promotes the joint ownership of actions, where appropriate. This doesn't mean the regulator has to sacrifice its authority. Instead, the regulator and industry work together to achieve the highest safety assurance.

Before this can take shape, the UK CAA believes it is essential to be aware of the strengths and weaknesses of the existing relationship. If the current relationship does not match key requirements, corrective actions may be required to establish across-functioning, collaborative partnership.

The regulator needs to learn to adopt a collaborative approach and enable itself to listen to industry, and jointly consider options – it is only then that a true joint partnership can be established. The benefits of a Joint Partnership create a new level of transparency between the regulator and industry, benefiting all aviation participants to increase safety. This transparency results in higher levels of trust, without breaking down the clear line that exists between the regulator and its regulated industry.

The UK CAA recommends starting the journey to RBS in partnership with industry. A defined goal must be agreed and all parties should recognise that not all answers may be immediately available. A collaborative approach will allow industry and its regulator to establish a common vision and embark on a joint, shared journey to achieve this. At the very heart of all this lies the fact that RBS is not about the regulator in isolation becoming a better regulator. The purpose of RBS is to increase aviation safety by both regulator and industry identifying the highest priorities and allocating resources accordingly. Transformation to RBS cannot be enforced upon industry – instead, it can only be successfully achieved through collaboration/engagement with all stakeholder participants.

From the very outset of the UK transition, a clear mandate from industry was essential to ensure future buy-in and to continually validate the UK CAA's approach. The UK CAA suggests a good starting point is to arrange for the regulator and industry to meet and discuss future safety strategy together. The UK CAA achieved this essential first step by arranging a conference where the regulator shared its plans to move to RBS and sought industry opinion. Industry's feedback was taken into account and the UK plans to implement RBS adjusted accordingly. This enabled a common vision between both parties, with both the regulator and industry working together to agree on the best approach to achieve desired outcomes.

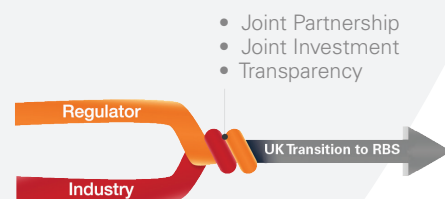
An essential part of moving to a collaborative approach is the regulator's realisation that it will be required to play different roles in its engagement. However, it still needs to be ensured that the regulator's authority is not compromised. It is, therefore, essential that industry recognises which role the regulator is playing at each phase of the engagement. In its efforts to achieve this, the UK CAA established a joint platform that is co-lead by industry and the regulator. This enables a safe environment that promotes free-flowing exchanges and ensures overall commitment to the transition to RBS.

Sharing long-term plans that detail how participants will transition to RBS will also help increase the visibility of future opportunities from a strategic perspective and allow industry to align strategic financial investments. A joint partnership approach will permit participants as a whole to be seen as speaking with a common voice,

based on a common vision, strengthening safety performance. Work doesn't end there however. A true joint partnership requires all participants to be able to freely challenge each other. As an essential part of RBS, regular checks are required to ensure that this initial commitment remains at the same level, and everyone is still on the same journey.

Once this collaborative relationship is built and matured, any upcoming issues can be resolved jointly in an engaged and shared manner, now that a suitable working platform/environment has been established. This approach underpins and is a key enabler to RBS, ensuring that the general public will be safe in the future as well as today.

Fig 1. The Collaborative Approach between the UK CAA and industry to established a shared vision to RBS.



Building a strong foundation is key to RBS. Building on it together is how transition will be fully integrated into all aspects of aviation safety.





Data as the key enabler of Risk Based Surveillance

Risk Based Surveillance as a concept is gaining interest and momentum in the international aviation arena. Its principles are central to the new ICAO Annex 19 and are often the subject of safety conferences and collaboration group publications. Regulatory bodies and industry groups welcome the concept recognising the need to move towards risk-based approaches and data-driven decisions. We are however in an exploratory phase where many States are devising strategies to move from prescriptive regulation to outcome-driven rules, whilst others are trialling performance based principles in their surveillance programmes.

Effective safety management as described in Annex 19 requires that information is systematically collected, analysed and monitored to identify risks and measure

progress against outcomes. Data is pivotal in this process. As a result the desire to identify useful and relevant data sources is becoming increasingly important. To be positioned to make decisions based on intelligence, we need to expand the existing knowledge spectrum and enrich the current evidence base. Inevitably, to assemble an integrated total system picture we will need to look beyond the conventional compliance and occurrence reporting data, and include broad type of information alongside expert judgement.

To enable development of a total risk picture, the breadth of data needs to encompass both hard data, such as accident reports and compliance data, and softer cultural and organisational indicators. Such elements may include: organisation health checks, resource and staffing levels, compliance and complexity of the aviation system and SMS maturity.

This turns towards data acquisition and information gathering is facilitated and expedited by current technology. The increase in computing power and the widespread use of the internet promote sharing, exchange and visualisation of information and data in a rapid straightforward manner.

Irrespective of the regulatory scope, the challenges in handling the volume and diversity of data still remain.

Whilst advances in information technology can have catalytic effects in enhancing data, there is a danger of cultivating a data farming culture, utilising data that is convenient as opposed to being important or relevant. Regulators should carefully govern the use of data to match the scope and the nature of their role. They should tailor their data feeds according to the size, maturity, and complexity of the aviation industry they regulate. It is unlikely that a small Aviation Authority would have the same requirements in terms of data volume, granularity, resource, capacity or IT system sophistication as a large Aviation Authority across different organisations and industry

Irrespective of the regulatory scope, the challenges in handling the volume and diversity of data still remain. We need to be

best prepared and equipped – both in terms of technical expertise and technological means – to store, filter, clean and generally manage and process the gathered information. Failure to recognise and address the limitations and the idiosyncrasies of the collected data will result in flawed analysis outputs, and consequently to misleading conclusions.

As considerable quantities of data are becoming accessible, the risk of inadequate data management compromising the delivery of the required outcomes is also growing. The key to success is to identify and account for the different data attributes when designing flexible processes and tools to administer the data streams.

A consistent systematic data management approach is required involving categorisation, harmonisation and consolidation of multiple data sources onto a common platform. This enables reliable processing, analysis and monitoring. Analysts then have access to a wide range of data where they can aggregate, compare and calculate metrics to measure and track safety performance. Safety and key performance (leading and lagging) indicators are good examples of analysed data. They can be used as monitoring metrics to measure effectiveness of actions and, when considered in combination with other indicators, can

provide a broader and more comprehensive picture.

It is important that performance indicators and other outputs of data analysis are combined with expert judgment to generate compelling evidence. The subject matter experts, using their expertise and field experience, are in a position to verify and complement the outputs derived from data analysis. Such a process results in developing thorough, balanced views on issues that matter, ultimately creating pictures of intelligence which become the basis of useful conclusions and informed decisions. When these elements are combined they set the foundations for a proactive approach in managing risk and a performance based, data-driven regulatory system.

Data is a key enabler of Risk Based Surveillance (RBS). Aviation Authorities aspiring to embark on RBS should establish data management approaches suitable to their needs and regulatory ambitions.

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