FUTURE SKY SAFETY

Keeping the aviation industry safe

Safety Intelligence and Safety Wisdom

16 aviation industry senior executives reflect on how they run a safe business in a commercial environment

A Future Sky Safety White Paper

European Commission

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DISCLAIMER

The interpretations of the material gathered together from the interviewees in this White Paper are those of the Project Team, and not necessarily those of the interviewees, their organisations, or affiliated organisations.

Executive Summary

Aviation today is seen as a very safe industry, yet recent accidents have shown that vulnerabilities still exist. In particular, events can occur which were not previously foreseen, so-called 'game-changers' such as MH370, MH17 and Germanwings 9525. Those at the top of aviation organisations have the difficult job of running their businesses profitably, and keeping them safe from threats whose likelihood – and in some cases, their imaginability – is hard to assess.

Safety Intelligence is generally being used to refer to the various sources of quantitative information an organisation may use to identify and assess various threats. This has traditionally been incident data and other safety information on precursor events which, when put together, can give reasonable predictions about likely accidents and measures to avoid them.

Safety Wisdom refers to the judgement and decision-making of those in senior positions who must decide what to do to remain safe and how they also use quantitative and qualitative information to support those decisions. This could be proactively in relation to a future or emerging threat, or reactively to an accident that has happened to another similar organisation.

Both Safety Intelligence and Safety Wisdom are needed. But while Safety Intelligence has been explored to some extent, the way in which top executives make decisions concerning safety is little understood and hardly researched.

This White Paper took the approach of asking senior executives themselves. Sixteen executives were interviewed from Airlines (3), Airports (3), Air Traffic Management (6), Regulation (2) and Research (2) sectors of the aviation industry (the interviews unfortunately could not include the manufacturing part of the industry, a key player in aviation safety). The responses they gave to a broad set of interview questions focused on five areas:

Safety first - but not at any cost

The senior executives interviewed discussed safety as something non-negotiable. However, there are economic and performance pressures on the industry that could

soon begin to affect safety – there is less and less 'fat' in the system, and the next cost-cutting exercise could impact safety.

Maintaining safety under pressure

Following an event, there is often political and media pressure to react. It is as if a decision must be taken irrespective of whether it is the right decision. Sometimes a quick reaction is clearly the right one to take, but other times it may be better to wait for more information, or not to react. The over-riding question is whether the decision or action will actually improve safety.

Accountability and Responsibility at the Top

The senior executives interviewed strongly emphasised their feelings of accountability and responsibility for safety, and this translated into active leadership on safety in their organisations. Regulators in particular need to be clear on their true accountabilities; if they take on too much accountability, this can disempower those they are regulating.

Searching for Evidence

The rich data sources need to include talking to post-holders and the frontline staff, to help detect weak signals. Quantitative data including KPIs are not enough. All the executives are relying on a rich variety of data, much of which is qualitative, in order to make decisions. This rich data flow only works if there is a culture of trust in the organisation, and a strong safety culture which ensures that safety information is fed up to the top.

Seeing around the Corner

Predicting where the next threats are coming from is not about collecting data from current situations. It is about being able to look forward. Waiting for the regulator to tell you what needs to be done is too late. The past is important, but the focus must be on today and tomorrow.

Outcomes

It appears from these interviews that executives look beyond safety data in their task of managing their organisation within an ultra-safe industry. This study has tried to expose some of the 'wisdom' that is being employed in identifying business decisions that protect safety. The following three aspects of this wisdom emerged as areas needing further consideration.

Complementing the view from the top

Most of the executives talked about safety being always protected no matter what type of cost cutting exercise was being discussed or implemented. There were several examples (quoted in the body of this paper) where executives have said 'No' to specific cost cutting plans. There was a strong personal belief that they are doing enough to protect safety in this current economic climate of cost reduction. These were the views on safety from the top of the organisation. It would be interesting to complement this with the views from the middle and from the front line.

Sharing the view of threats within the industry

The executives spoke about their search for safety information in terms of both quantitative and qualitative information. Keeping the ultra-safe aviation industry safe is being done with richer information sources than a simple target based management approach using just KPI's. Thus a target based approach only appears to work if it is supplemented by qualitative information such as direct discussions between those operating the organisations and those setting the targets.

Anticipating the next threat

There was an often stated requirement from the interviewed executives that they needed a more predictive approach to identifying future threats to safety. This has impacts on the way regulators seeks evidence to support future regulations. Historical data, especially quantitative data, will not identify future threats. This is about being wise before the event – not waiting for data to accumulate.

Follow-up

Three follow up themes can be identified;

A survey of top executives should be balanced with similar surveys of front line staff and middle managers in order to establish a more complete qualitative view of safety performance.

It appears advisable to establish forums of aviation industry executives to identify top risks followed up by forums with industry executives and policy makers to identify ways to improve industry performance without provoking new safety threats.

Identifying emerging threats needs predictive methods to supplement the historical data-driven evidence-based approach. Risk identification and mitigation processes, including safety regulation, need to take into account emergent aspects where quantitative data do not yet exist.

It is hoped that some of the ideas expressed in this report may help towards supporting safety wisdom across the industry, keeping it ultra-safe.

Background

This white paper is the output of a study from an EC-funded Horizon 2020 Programme called Future Sky Safety which is looking at, amongst other safety priorities, how organisations stay safe in their day-to-day business operations. The project includes a focus on how senior executives run a safe organisation. This involves engaging with some of the senior executives – typically CEOs or COOs – and asking them how they deal with safety. This white paper reports the results of this study, discussing how executives use safety intelligence to make safe business decisions.

Safety Intelligence is used to refer to the various sources of information an organisation may use to identify and assess various threats. This has traditionally relied upon incident data and other safety information on precursor events which, when put together, can give reasonable predictions about likely accidents and measures to avoid them. However, as complexity of the aviation system increases, such models may fail to predict the next accident, which is why the industry is now considering advanced analytical approaches such as Big Data, to help anticipate what accidents may be 'around the corner', only perceptible via weak signals. ICAO describes Safety Intelligence as 'Analyzing large and diverse datasets to extract useful information [...] to deliver the content required to better manage the safety of the aviation system'.

Safety Wisdom refers to the judgement and decision-making of those in senior positions who must decide what to do to remain safe, and how they use quantitative and qualitative information to support those decisions. This could be proactively in relation to a future or emerging threat, or reactively to an accident that has happened to another similar organisation. Safety Wisdom relies to a large extent on the experience and attitudes of the leader at the top of an organisation, including their management and decision-making style, their problem-solving approach, and their understanding of safety.

Safety intelligence is being discussed in many quarters of the aviation industry as an essential aspect of keeping the industry safe. It is widely acknowledged that senior managers have a critical influence on the overall organization's performance and a distinct influence on organizational safety.

This is shown by most of the major accident investigations [1, 2] and safety science research. [3]

[1] Baker, 2007.
[2] National Commission on the BP Deepwater Horizon oil spill, 2011.
[3] Day and Lord, 1988; Clarke, 1999; Fruhen et al., 2014a & 2014b.

What the Science tells us

Management commitment to safety has been identified as a predominant safety climate factor, that is, it sets the tone for safety in the rest of the organisation[4]. Management commitment has been defined as[5] *«The extent to which management is perceived to place a high priority on safety and communicate and act on safety issues effectively».* But the research[6] also points out that *«good safety management requires more than simply knowing 'the safety script'»* A demonstration of commitment is needed, especially when there are conflicting safety and production goals. In other words, senior executives and leaders must *'walk the talk'.*

Management's attitudes and behaviours also significantly impact both the organisational culture and its safety performance[7] and for senior leaders (e.g. CEOs and COOs) this includes their **personality**[8] . Recent studies have identified other factors that support the senior managers' capability to engage safety behaviours: the **contribution of problem-solving, the ability to perceive others and the training and guidance for senior managers**[9].

What the Science doesn't tell us

Although the central role played by Executive Managers in organizational safety has been widely demonstrated, studies involving them are still scarce and there are many dimensions which are still largely unexplored. There is little research into the experience and the role of managers in relation to safety and into the relation between safety and leadership.

One of the biggest gaps concerns the **Executive Managers' decision-making process** which is one of the main dimensions identified in the literature as a key expression of safety commitment. Indeed, nowadays it is still not clear how Executive Managers consider safety in their business decisions and hence how they draw upon different kinds of safety information and how this feeds into their process. Therefore, although we know quite a lot about the various types of information and data available for making decisions on safety (safety intelligence), we know little about how senior executives use such information to make 'the right call' (safety wisdom).

Why focus on this now?

The aviation system today is experiencing pressures from various sources. Competition between businesses for the same markets (airlines, airports and air traffic management) and pressure to improve efficiency of the European air transport system are two of the major forces shaping the industry. The key question is:

"How do those at the top of aviation organisations ensure that their businesses stay safe within this climate of competition, cost reduction and efficiency improvements?"

Aviation is considered a very safe industry, but how does each player know how safe is safe enough? Rather than carry out an academic study, we decided to ask a sample of senior executives from across the industry this question. The rest of this white paper discusses the answers and insights we gained into safety wisdom in the aviation industry.

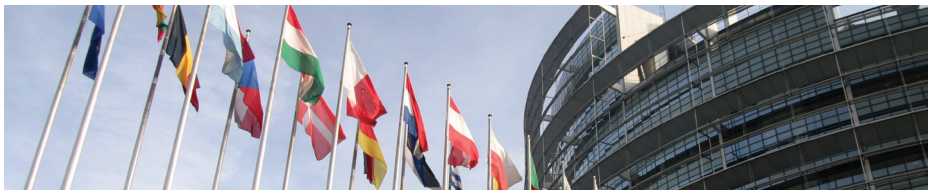
[4] Fruhen et. Al, 2014; Beus et al., 2010; Christian et al., 2009.
[5] Neal and Griffin, 2004.
[6] Flin, 2003.
[7] Flin et al., 2000; Guldenmund, 2007.
[8] Fruhen et al., 2014; Miller and Dröge, 1986; Miller et al., 1988; Miller and Toulouse, 1986.
[9] Fruhen et al., 2014.

Intended audience

This document is aimed at the following audiences in the aviation sector:

Senior executives

this is a chance to see how your peers think and act concerning safety in business decision-making and judging safety risks. The content of this report is largely verbatim quotes – these have not been sanitised, they are authentic.



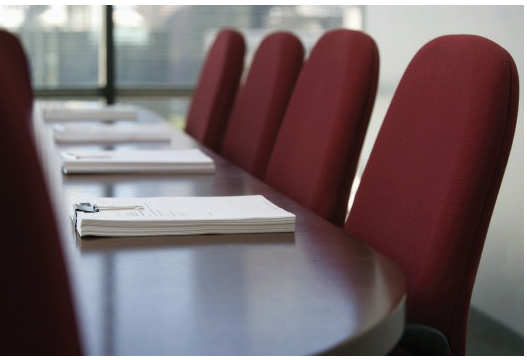
Policy-makers

this is a chance to hear unfiltered messages from industry leaders who are managing the business risks, to see the pressures they are under, and their perspectives on policy-making and how it affects their business and aviation safety.

Safety professionals

this is a chance to see how senior executives make judgement calls on safety risks, what information sources they rely upon, and what they think about the safety numbers, Key Performance Indicators, safety targets, etc.

Methodology



AIRLINES
CEO EasyJet,
CEO KLC,
COO KLM

AIRPORTS
COO Milan Airports,
Non-Exec Director Gatwick Airport,
HoU NATS Luton Airport

AIR TRAFFIC
CEO ENAV, COO Austro Control,
Director Maastricht Upper Area Control Centre,
CEO NATS,
Director Borealis,
Director Network Manager EUROCONTROL

REGULATORS
CEO UK CAA,
Head of Safety Research EASA

RESEARCH
European Commission HoU DG Research & Innovation,
Head of R&D EUROCONTROL

What is it like to run an organisation that is part of the ultra-safe aviation industry? How does it feel to be the one who is ultimately accountable for safety? What sort of safety information do top executives look for as they manage their business? How do they make the right call?

In the summer of 2015 we approached a number of organisations and invited senior executives for interview. The organisations were identified to represent the different key segments of the aviation system: research bodies, manufacturers, airports, air traffic organisations, airlines, and institutional organisations (including the European Commission, EASA and EUROCONTROL). Senior executives from all of these segments were able to participate in the time-frame, except policy makers and manufacturers.

16 top executives were interviewed in total, to identify the types of safety information they seek in their day to day job of running their business safely. We used scenarios to explore the situations they find themselves in and to help them comment on the demands of being accountable for running a safe organisation.

Each executive was interviewed by two interviewers (in total eight individual interviewers) with backgrounds in aviation and organisational safety.

A topic guide was used to maintain standardised questioning across the interviews, and included the following questions:

What is your contact with safety?

Can you give a real example of a business decision scenario to show how you consider safety aspects?

What kind of safety information do you consult?

How does safety information feed into the decision-making process?

How do you monitor the impact of business decisions on safety?

What do you perceive as their main challenges in making business decisions that could affect safety?

Any final comments.

Two different scenarios were used in point 2 of the above topic list. One scenario was of a past event or crisis that the interviewees themselves offered as an example to explain their decision processes. This was followed by a separate scenario with the same aim, but raised by the interviewers. These scenarios were intended to challenge the senior executives, and were selected by the Project Team as representing current but controversial safety topics where there was often no clear or unanimously accepted answer or solution to the issue.

Each interview lasted between 45 minutes and an hour and a half, with the average lasting an hour. In most cases the interview was recorded (this was optional for the senior executives). This allowed the interviews to be thematically analysed by a professor with a background in safety and expertise in interview methods. Five members of the research team also then independently reviewed a sample of the interview transcripts and together identified five key themes, as discussed in the next section.

The five key areas identified from the interview analysis are as follows:

1. **Safety first - but not at any cost**
2. **Maintaining a safe organisation when under pressure**
3. **Being the one at the top** – accountability and responsibility
4. **Searching for evidence** – identifying today's issues
5. **Seeing around the corner** – identifying the next threat

Throughout the document quotes are identified as coming from one of the following aviation sectors – air traffic control (ATC), Research & Development (R&D), regulation (REG), airports (APT) and airline. Each theme is introduced by a summary based on the interpretation of the responses and followed by illustrative quotes from the interviewees.

Scenarios for Senior Executive

- **MH17 - why did some airlines decide to overfly Ukraine?**
- **Does privatisation of some Towers affect safety?**
- **Are SES2 KPIs really measuring safety performance?**
- **How does the "no-fly/no-pay" policy affect pilot fatigue?**
- **How does social media affect your decision-making?**
- **Does reduction of supervisors affect safety?**
- **Are single-man sectors using lots of overtime safe?**
- **During the Volcanic Ash crisis, what were the criteria for flying/not flying?**
- **Do temporary contracts for pilots have any impact on safety?**
- **Do the new measures following Germanwings really make us safer?**
- **A known risk of critical hardware failure was not mitigated due to the upgrade costs. Could it happen again?**

Safety first - but not at any cost

The challenge for the top executive is how to manage any potential trade-offs between cost and safety. Executives spoke about various pressures to reduce costs coming from various sources:

> competition for air traffic control contract at an airport;
> low cost airlines challenging both flag carriers and airports to improve cost-effectiveness;
> political pressure to improve efficiency of the aviation industry.

A key principle often stated was the fundamental importance of safety to the whole business:

"If you haven't got safety performance, you haven't got a business." APT

"No one's saying we should be wasteful, but the amount of resources to deal with safety is now less than there's ever been." ATC

"The basis of everything in our industry is safety." APT

"The life of our industry is based on safety because we are risky by nature." REG

"Our brand is safety." ATC

Several interviewees did not see safety as necessarily increasing costs and even indicated that safety can also be a mechanism for reducing some costs:

"So I personally think that safety is not a cost. It is something that helps the organization work better and, in the end, saves cost in the medium to long term." APT

"Our insurance costs are linked to our safety performance." ATC

The situation of how the pressure to improve cost-effectiveness has changed the industry was described well by one of the senior executives (see Rolls Royce analogy on next page). However, controlling costs and staying 'safe' is bringing challenges to organisations. There is a drive in Europe to improve efficiency and remove excess 'fat' in the system, but some clearly feel there is little or no fat left.

"I can assure you we can't get any lower than this. And it's not reasonable to go less than that, because then I think you are affecting safety. I am known as a cost guy, but I think it is hazarding safety. Examine us if you think we have too much fat." ATC

Safe enough

"So, traditionally large state ANSPs have developed the Rolls Royce because they can and the assumption has always been that the airport wants to pay millions and millions of dollars to have a Rolls Royce because they appreciate all the extra value. And, in times gone by, that might well have been the case. If you look at the big-city airports where bureaucracy was king and money really didn't matter, then there was very little financial control on the value of contracts, including air traffic control.

Fast forward to the new world

People don't want the Rolls Royce anymore. People probably want a Ford Focus which is a reliable performer without the knobs and bells but is going to get you there. And that's the way the market is shifting and that's how we are responding now in moving working practices, in moving employment models, in moving the whole way we set ourselves up to get rid of the trappings of Bentleys and Rolls Royce's and become that Ford or that Kia or anything which makes the Euro NCAP safety standards and gets you there reliably"

APT

Ensuring safety while trying to improve business efficiency sometimes means deciding when to say 'No':

"We asked for a quicker turnaround, of 30 minutes instead of 35 mins. We did a test on 5-6 stations. We invited handling companies, we did the test and we found out that everything was very complex. We sent 5 investigators and we did a complete drill. They came back, had a huge discussion, and at the end we stopped the test. I'm not willing to do it. We are managing safety, nobody else is doing it, it's us." Airline

"We put a lot of emphasis on being fit to fly, also extended to ground personnel, fit to do the job. If people are not fit, they can get off the trip; they will be removed from the trip. We can get them on a trip two days later If it happens more than twice, we ask 'what can we do to help you'? It's even amongst pilots and cabin staff, the question 'Are you sure you are able to fly? ' is not a difficult question to ask." Airline

"If you think you're a good airline in putting the last dollar in entertainment at the cost of safety, you're an idiot." Airline

"So I know what delivers a safe operation by all of the things that I've described to you up to this point. You can't compromise on that. You can think of ways of delivering that safety differently but ultimately, there is a cost in terms of manpower and technology to deliver a throughput at a safe level. Can't move that." APT

"We don't pay for flying-hours; pilots have a standard salary; if they miss a flight this will not cut into their salary. Before moving to such a system, I would not go there without having mitigation measures in place. This is not the way to reduce costs." Airline

Maintaining a safe business when under pressure

Top executives mentioned several cases in which they were under pressure to make certain decisions, but were able to safeguard safety, for example:

> starting to operate into an airport where a combination of environmental factors (terrain and weather) may create problems for maintaining the departure schedule;
> the Icelandic ash-cloud in 2010;
> media pressure, newspapers inflating aviation incidents and accidents, or passengers using smart phones to broadcast to the world an accident as it happens.

"Think about the Daily Mail test, i.e. if it goes wrong, are you getting in the papers? And that's the common sense test you apply. Because if you're in the Daily Mail, you've done it wrong" APT.

Normal operations can also come under pressure:
One airline had a safety rule not to take off in certain unfavourable conditions from a particular airport, whereas other airlines were taking off. ***The passengers complained, putting pressure on the pilot, who then called a senior executive: "The others are flying, why not us? Please hear the passengers." The captain didn't want to fly, but she was out of arguments. "Did I take some of the pressure off? Yes. It took some stance to say no and face passengers and competition." Airline***

"There is never enough time to do the job, so you have to be ruthless in prioritization and you have to be ruthless in setting expectations and you have to be expert at delegation. But you are delegating to people who are primarily operational, so you have to be very careful that you are not pushing them to the point where they are not safe operationally." APT

Media and social media were identified as a particular challenge to the organisations. The speed of communications and the way incidents can get reported rapidly by the public or the media leads to increased pressure on executives

who can find themselves under the public spotlight justifying their past decisions. Making decisions in such times is difficult due to the pressures of needing to be seen as taking essential rapid actions if necessary against taking a more considered and balanced view that only a full inquiry can provide.

"*There is a huge impact (from social media), not sure if it's about my role, but it's affecting us. I had long discussions about what to do. What struck me is how quickly Europe reacted. EASA moved on that [the Germanwings crash] too much and came up with a solution. This had an effect on me, because I am not convinced that this is a solution to the problem." Airline*

"There are many political pressures to make a decision rather than make the right decision." ATC

"[The Just Culture approach] is under serious threat these days because of the availability, misuse and misinterpretation of data and information by the media on a constant basis and we have to think through how we cope with that change." APT

In a crisis there is often pressure for change as a reaction to the specific event. Yet the executive role is to consider the wider impacts and to justify why change may not be immediate.

"And that was followed in a kind of knee jerk / follow-my-neighbour set of reactions by other safety regulators throughout Europe and we were then left with the problem of how we get out from this situation". APT talking about volcanic ash.

"Now that was a massive organizational change to say that we don't wait until the accident investigation is finished (to take action) because in the meantime, without prejudicing the investigation, there is stuff we can identify." REG

Being the one at the top accountability and responsibility

We heard the phrase *"I am the accountable one"* several times from the executives. However the issue was expanded into the need to sometimes take on responsibility, which can be difficult in a complex industry where many organisations are linked and where there may be overlaps and possibly gaps in responsibilities.

"We could have sat back and said this is a regulatory responsibility of the states. Not our business. But we believed we had a leadership role, and we sought to exert that." APT

"The debate we've been having is where do our responsibilities begin and end. Our job is not only to look after safety from the areas that we have direct control but do our best to improve the overall safety." REG

"I think it's fair to say one of the big challenges for a regulator is the accountability. What do you take accountability for without deluding yourself, without disempowering the entity that is ultimately accountable, but yet to be ready to be accountable for what you are truly accountable for." REG

*"And then it's, of course, when you're talking about the **safety leadership**, it's actually how do you communicate? […] How do you act as a leader on an everyday basis? How do you respond to people's reactions and things like that? How do you meet complaints from controllers?" ATC*

"Taking responsibility for safety is also about demonstrating everyday leadership in building a strong safety culture. Dealing with risks is to lead by example: admit your own errors, do not get angry if people report issues, otherwise they won't do it next time." ATC

Searching for evidence
identifying the real issues

To manage a safe organisation requires access to data and information that will help determine where, when and what action should be taken. There were remarks about the importance of integrated Safety Management Systems and of how safety management these days is better integrated into the Board room.

However, nowhere did we hear talk of exclusive reliance on KPI's, targets, big data, numbers or dashboards. While these have an important part to play, the discussions were about the need for a richer level of detail on what is happening at the front end of their business, and deciding how to react even if the information is scarce.

"I get a data-based answer and I can see whether there is an issue or not. To find out what the cause is - I'll go and find out because it's only numbers - I go and say to the base captain, what is going on? " Airline

"It's about being as porous as you can, more about being open to hearing information from any sources than having a reasonably disciplined reporting system." ATC

"Many organisations only look at data, but that's not enough, the quality has to be assessed as well [...]. Qualitative safety relevant information is as important as quantitative safety trends." ATC

"Don't rely on the reporting line; speak to the people to gather different views, different priorities and get a global picture to make the decision [...] talk to the people on the front line [...] If you only rely on the reporting line and figures, that's not enough!" ATC

"Sources for safety relevant input should not be limited to a certain group of people, this information could be generated anywhere within the organization." ATC

There were also several discussions about the need for a good safety culture to find evidence of safety risks.

"If people feel obliged to participate (in safety reporting) because of the rules, it is OK but not the right way. Teach people so that they feel it is part of their culture[…] Risk is always present, continuous improvement tension has to be part of staff culture." APT

"It is not a question of numbers (the more the better) but really a safety culture issue. If the number of reports increases does it means the system is becoming unsafe or that there is just more reporting?" ATC

The importance of Just Culture was also stated as being fundamental

"Do not punish when there is a report on safety […] People must be free to report anything that goes wrong." APT

in getting access to what is really happening at the front end of the organisation.

"Yes, we have a documented just culture policy. I think it works very well in flight ops, it's just done by the book. Even if a captain makes a mistake, he will be re-trained. I don't think it quite works in ground ops. They think they will just be sacked, so we try and emphasize just culture." Airline

It was also stated how important it is to communicate concern about safety and what action is to be taken:

"I think communication is an essential part of safety. Each leader and each boss has to do it. We need to respond much more than we did before. The organization thought that you communicate when you like, but you have to always communicate." ATC

"When investment decisions are taken regarding safety, communicate on these." APT

Seeing around the corner
identifying the next threat

The topic of identifying threats where there was a lack of historic data was raised in most interviews along with the need to become more predictive. The threat of the unknown or undetected event has become more relevant in the aftermath of Germanwings and MH17.

"The only way to see around the corner is having a very open relationship with your post-holders. I have a very strong relationship with my post-holders. There's no fear in the relationship." Airline

"We were doing FRMS (Fatigue Risk Management System) a long time ago. The CAA like and respect that and they use that as an example for other airlines. We do it for us, not because we are regulated to do it." Airline

Regulators are faced with the difficulty of trying to set standards when there is insufficient data to quantify the risks. As a result, it is often stated that regulators and the industry as a whole might have to take a different approach towards identifying and evaluating risk.

"How can we be predictive? How do we get better in looking forward?" Airline

"We look to someone to have a model to look around the corners. We are good at reactions, but we are not very good at looking around the corners. What's going to happen in the next couple of years?" ATC

"The board is interested in safety today, yesterday and tomorrow, we want to know what's happened, what the current issues are and we want to know how fit we are for the future, what are the emerging issues, how does that fit with our skills and our capabilities, our regulatory policy, etc. So we've moved much more from a yesterday to today to future, as opposed to what went wrong." REG

"We have to educate people, because they can't just do prediction. If you look at where we should go, this is the biggest challenge, how can we prevent situations occurring, how can we be predictive?" Airline

The need for organisations to act before there are regulations was often stated as necessary in an industry always meeting fresh challenges to safety. The role of the regulator was discussed against this topic of identifying new threats in time.

"What I want my legacy to be is that we are more forward looking. It's my yesterday, today, tomorrow rather than just yesterday. I don't want tombstone regulation, that is, you shouldn't wait until you have buried the bodies before you learn the lesson." REG

Acting on weak signals

Running a safe business means sometimes going out and collecting the information rather than waiting for an event to happen.

"We started to receive some stick-shaker reports and we thought, is this the beginning of something? One week later we got another stick-shaker report. I agreed with the chief pilot to execute a full test flight over the sea. At the end of the test we flew through a cold cloud and got a stick-shaker warning. Now we had understanding of stick-shaker events and informed the manufacturer."

Airline

Challenges in keeping the organisation safe

To close the interviews each interviewee was asked to identify their main challenges to running a safe organisation. Some examples are given below:

"The speed of tech is the big challenge, historic regulatory process will not be able to cope with new tech. Drones are an example of where the old structures don't tend to work. Why? Because technology is moving at such a phenomenal pace." REG

"To have the right people on the right position. That is the biggest challenge. How do they deal with people? Can they work in a team? Can they take a 'no' for an answer? Do they know safety?" Airline

"The continuous change of rules: new incident = new rule. It is ok and not ok. How to constantly catch the compliance on new rules? The safety rule of Europe is top-notch but if you overdo it, you can get disconnected with safety." Airline

"The other challenges are around regulations and total focus on cost. I think they will cut out the fat. There is a worry for me that says, everybody is worried about the cost, e.g. we have bad weather today, we can't afford to bring anyone in. But if we're not careful, there will be a mismatch between customer expectations." ATC

"SESAR project is a big challenge because of tech and it is a tech step change." REG

"In the preparation for (SES 2) RP3, it could be interesting to assess how stakeholders potentially see safety targets. Is there a bonus/penalty discussion on safety area? Does the EC have an influence through the Single Sky Committee on how Safety is delivered?" ATC

"For the European Commission, not solving the Single European Sky is a safety element. It is becoming a hazard. The more complexity there is, the more fragmentation, the more traffic, more costs, more fatigue, less safety. The European Commission is not bringing it together. There is no ownership, and in the end it is a safety element. We need quicker turnarounds, we use more fuel, we burn money, we have less safety." Airline

"It is culture and awareness. A quantity of risk is always present, so safety never ends. You need to teach people that safety is very important, you have to fight for it every day; it's in our business. If people feel this issue is part of their culture, then it's done." APT

Outcomes from the interviews

It is difficult to be conclusive from this small set of interviews but we can summarise the themes as follows:

Safety first - but not at any cost

The senior executives interviewed discussed safety as something non negotiable. However, there are economic and performance pressures on the industry that could soon begin to affect safety – there is less and less 'fat' in the system, and the next cost-cutting exercise could impact safety.

Maintaining safety under pressure

Following an event, there is often political and media pressure to react. It is as if a decision must be taken irrespective of whether it is the right decision. Sometimes a quick reaction is clearly the right one to take, but other times it may be better to wait for more information, or not to react. The over-riding question is whether the decision or action will actually improve safety.

Accountability and Responsibility at the Top

The senior executives interviewed strongly emphasised their feelings of accountability and responsibility for safety, and this translated into active leadership on safety in their organisations. Regulators in particular need to be clear on their true accountabilities; if they take on too much accountability, this can disempower those they are regulating.

Searching for Evidence

The rich data sources need to include talking to post-holders and the frontline staff, to help detect weak signals. Quantitative data including KPIs are not enough. All the executives are relying on a rich variety of data, much of which is qualitative, in order to make decisions. This rich data flow only works if there is a culture of trust in the organisation, and a strong safety culture which ensures that safety information is fed up to the top.

Seeing around the Corner

Predicting where the next threats are coming from is not about collecting data from current situations. It is about being able to look forward. Waiting for the regulator to tell you what needs to be done is too late. The past is important, but the focus must be on today and tomorrow.

Ways Forward to support safety intelligence and safety wisdom

There are three aspects that have emerged from these 16 hours of discussion that warrant further exploration.

Complementing the view from the top

Most of the executives talked about safety being always protected no matter what type of cost cutting exercise was being discussed or implemented. There were several examples (quoted in the body of this paper) where executives have said 'No' to specific cost cutting plans. There was a strong personal belief that they are doing enough to protect safety in this current economic climate of cost reduction. These were the views on safety from the top of the organisation. It would be interesting to complement this with the views from the middle and from the front line.

Sharing the view of threats within the industry

The executives spoke about their search for safety information in terms of both quantitative and qualitative information. Keeping the ultra-safe aviation industry safe is being done with richer information sources than a simple target based management approach using just KPI's. Thus a target based approach only appears to work if it is supplemented by qualitative information such as direct discussions between those operating the organisations and those setting the targets. Applying this ultra-safe model all the way across the industry, including to those policy makers who also set industry targets, would suggest a need for a direct dialogue between the policy makers and the air traffic control, airlines and airport organisations to ensure that the safety information under discussion is current, relevant and as complete as necessary.

Anticipating the next threat

There was an often stated requirement from the interviewed executives that they needed a more predictive approach to identifying future threats to safety. This has impacts on the way regulators seek evidence to support future regulations. Historical data, especially quantitative data, will not identify future threats. This is about being wise before the event – not waiting for data to accumulate. R&D uses predictive approaches to explore the potential emergent risks of new technologies and procedures. Perhaps some of those skills and techniques could have wider application within the industry when trying to identify

emerging threats. Three follow up themes can be identified;

A survey of top executives should be balanced with similar surveys of front line staff and middle managers in order to establish a more complete qualitative view of safety performance.

It appears advisable to establish forums of aviation industry executives to identify top risks followed up by forums with industry executives and policy makers to identify ways to improve industry performance without provoking new safety threats. Target-setting needs to be informed by qualitative information from those delivering the targeted services. The use of quantitative data alone is not what is keeping this industry ultra-safe.

Identifying emerging threats needs predictive methods to supplement the historical data-driven evidence-based approach. Risk identification and mitigation processes, including safety regulation, need to take into account emergent aspects where quantitative data does not yet exist. The aviation system is now so complex that the various effects of cost reduction business models and new technologies make for a very delicate web of relationships.

Concluding comment

This study has tried to expose some of the 'wisdom' that is being employed in identifying business decisions that protect safety. It is hoped that some of the ideas expressed in this report may help towards supporting safety wisdom across the industry, keeping it ultra-safe.

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FOR FURTHER READING

An AP15 White Paper on Safety Intelligence – interviews with CEOs and Senior Executives from 12 Air Navigation Service Providers.

http://www.eurocontrol.int/sites/default/files/article/content/documents/nm/safety/safety_intelligence_white_paper_2013.pdf

An AP15 White Paper on Safety Culture – eight CEOs and Senior Executives discuss their organisations' safety culture journeys.

http://www.skybrary.aero/bookshelf/books/3224.pdf

ICAO Safety Intelligence website

www.icao.int/safety/SafetyManagement/Pages/Safety-Intelligence.aspx

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