

AIRWORTHINESS MATTERS

2016



INTERNATIONAL FEDERATION OF AIRWORTHINESS

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Foreword



Cengiz Turkoglu
Chairman of the IFA Technical Committee

Welcome to this year's 'Airworthiness Matters'. Although we continue communicating with our members more electronically, 'Airworthiness Matters' is the only printed publication we produce every year. We always aim to include articles from our members who wish to share their experiences but we also include some thought-provoking articles to initiate debate on some fundamental challenges and this edition includes some of those as well. I hope you find it as beneficial as last year's.

Accident statistics can be quite controversial particularly about the classification of accidents and how the data is analysed and interpreted. Sometimes various reports produced by different organisations present contradicting figures. Nevertheless, ICAO's Safety Report 2016 includes some statistics comparing the global safety performance achieved in 2015 with previous years' results. Overall, in 2015 the global fatal and non-fatal accident rate was reduced compared to 2014. The figures also show that while the non-fatal accident rate in 2015 was lower than 2013, unfortunately fatal accident rate was slightly higher. Loss of Control in Flight (LOC-I) and Runway Safety (RS) accidents continue to be the two key accident categories causing the most of the fatalities and airworthiness issues such as systems failures can certainly be causal and/or contributory factors to these accident categories. This is also reflected in two key documents produced by EASA, Annual Safety Review 2016 and the European Plan for Aviation Safety (2016-2020).

The ICAO's report also includes an interesting point about airworthiness in relation to The Universal Safety Oversight Audit Programme Continuous Monitoring Approach (USOAP CMA), which aims to measure the effective implementation of ICAO SARPs. Out of 8 categories, with 73.5 percent, 'Airworthiness' is the best performing category in terms of global ICAO SARP implementation.

All of these statistics and the results are indication of the remarkable safety performance achieved by those professionals involved in airworthiness domain. When such progress is made, unfortunately airworthiness and human factors issues do not always appear at the top of the agendas and it becomes more difficult to argue for investment; therefore we need to continually highlight the importance of both initial and continuing airworthiness in all of the committees we participate including the ICAO Airworthiness Panel, European Human Factors Advisory Group, EASA Collaborative Analysis Group and others around the world, which our representatives are involved in.

While writing this foreword, ICAO's 39th Assembly continues to host many sessions and meetings, which will – no doubt – initiate some new development in Airworthiness domain as well. Despite all the challenges, thanks to its sponsors and supporters, IFA will continue its activities including organising workshops and forums around the world to bring professionals together and lead the debate in continuing airworthiness.



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President's Message



Frank Turner
IFA President

So far 2016 has proven to be challenging where aviation safety is concerned. The incidents in Rostov-on-Don and more recently Dubai, serve the purpose of reminding us of our ongoing duty to airworthiness and safety.

IFA has already been working behind the scenes in the last year and has re-focused on the future. The introduction of the new student membership grade, and the re-development of the IFA organisation has allowed us to improve our outreach to both our Corporate, Associate and Student members.

This includes, the formation of the IFA Board under my Chairmanship, the appointment of Trustees who are Non Executive members and the appointment of Rustom Sutaria as a Board Member and Vice President of Corporate development.

IFA's efforts in both the short and medium term have already intensified in terms of the development of IFA's contribution to 'Critical Interface' initiatives that focus on risk prediction, quantification and mitigation.

Over recent years there have been a number of incidents where there was an unidentified risk, which presented its ugly head. The locked cabin door with access controlled cockpit assess with only one crew member on the flight deck, the engine cowl incident and the not so recent one of the lack of positive locking on thrust reversers in flight.

Other recent safety concerns including lockable overhead luggage compartments also appear to be solving problems concerned with aircraft emergency egress. These recent incidents have identified not only operational weaknesses, but have also raised doubts from the engineering & maintenance arenas.

What all of these have in common is that these risks were not identified by those concerned and hence there was nothing done to mitigate them. However, just as important is the fact that they are all concerned with multiple critical interfaces from design, maintenance, operations and senior management.

Efforts to date have been to investigate the reasons for an incident or accident, identifying what, or who went wrong and learning from our mistakes.

An effective approach in the past, it is no longer appropriate for the future of a very safe industry, but one affected more than most by social media that will expose and sensationalise any shortcomings in the industries' ability to adequately predict risk and effectively mitigate it.

You will see from this magazine a number of papers which approach this subject, but we in IFA believe that to meet our objective of continuously improving airworthiness, we need to take the Olympic Athlete's approach of continuous improvement in identifying those weaknesses in our risk prediction across the critical interfaces, from design through to senior management

We are going for "Gold" on this one.

IFA Board

To keep IFA with good corporate governance and to ensure that we fully satisfy the requirements for the UK Charities Commission changes approved by the membership at our last AGM have been made to our organisation.

This has resulted in the formation of a Board of Directors to replace the Executive Committee responsible for the Corporate Governance of IFA and specifically including the formal approval of all membership, sponsorship and use of the Trust Fund and Awards.

The Board is made up of representatives of Corporate and Associate members who are Executive members and Trustees who are Non Executive members who carry a veto on all issues affecting IFA. It goes without saying that all of these Board members whether Executive or Non Executive are voluntary and receive no fees.

Executive Board Members

Air New Zealand Engineering Ltd
ALAEA
CAA UK
Cranfield University
Emirates Airline
Etihad Airways
Kuwait Airways
Monarch Aircraft Engineering Ltd
RAeS
Jared Ajwanga
John Goglia
Jim McKenna
Rus Sutaria

Non Executive Board Members

Ms E Bossom
Mr R Holliday
Mr S John OBE
Mr B Simmons
Mr F Turner

IFA New Vice President appointed



Rus Sutaria has been selected as IFA's VP – Corporate Development

The International Federation is pleased to announce that Rus Sutaria (Chairman of the IFA Awards Panel & Board Member) has accepted an invitation to assume the role of Vice President for Corporate Development.

IFA has been working feverishly behind the scenes, the culmination of which includes the introduction of a new Student membership. Part of these changes also identified the need for a formal line of corporate communication.

"I'm delighted to have been asked to assume the role", said Rus Sutaria.

The initial aim will be to raise our profile with the student membership. These young, talented and creative people absorb information in vastly different ways. The key is to develop new approaches utilising mobile phone and other technologies like social media to engage with our future aviation generations. Rus added further, that he recognised the challenges ahead of him, but was also quick to point-out that he was already well supported by a talented and energised team in Emma Bossom (Trustee) and Jared Ajwanga (VP Africa).

Joe Sutter

21st March 1921 – 30th August, 2016



Born in Seattle, Washington, Joseph Frederick Sutter grew up in Beacon Hill (Now affectionately known as Boeing Hill), Joe was always in eye-shot of aviation and Boeing's Seattle plant.

Joe was of Slovenian descent — his father, Franc Suhadolc from Dobrova, Slovenia, came to America as a gold prospector. In 1940, Joe attended the University of Washington and graduated with a bachelors' degree in aeronautical engineering in 1943. During his years of study, Joe also worked part-time at Boeing Plant No. 2 in order to pay for his education. It is safe to say, that he could not have received better preparation for that which aviation had in store for him.

Following graduation in 1943, Joe served as a deck officer on a US Navy destroyer before joining Boeing as an entry-level aerodynamicist. What began as a temporary job in order to support his newly pregnant wife became his life's work; he remained with Boeing for another 40 years.

With the impending arrival of the 'jet-age', most other engineers at Boeing were working on more exotics aerospace projects, including the supersonic transport and other jetliners. For Joe however, he had the task of ironing out the design problems of the Boeing 377 Stratocruiser. He acquitted himself well enough to attract the notice of his superiors, Joe was soon at work on various prototypes to Boeing's first jet aircraft – the B707, B727 and B737. Joe received his first patent for the B737 by mounting the engines to the underside of the wing – rather than at the rear. This allowed for a wider fuselage and thus a greater freight capacity.

The B737 became the greatest bestseller in commercial aviation history, and the first to clock up more than 100 million combined miles around the world. Rather surprisingly, the project remained Joes' personal favourite. However, he will be most remembered for taking up a challenge that had been laid down by Juan Trippe of Pan American World Airways, who wanted an aircraft that was more than twice the capacity of the B737. Other Boeing engineers were tied up with other supersonic jet projects. Joe Sutter picked-up Juan Trippe's gauntlet, and gave Pan-American, together with the rest of the world, the Boeing 747. Following the aircraft's launch in 1968, the aviation world was never the same.

Joe retired from Boeing in 1986 as Chief of Engineering, and went on to consult Boeing on later 747s including the new derivative B747-400 in 1989, as well as other world-beating aircraft from the Boeing stable, together with joining the Presidential Commission on the Challenger disaster. July 2010, he became a member of the Boeing Senior Advisory Group which studied a clean sheet replacement of the Boeing 737 or to re-engine the current design. In 2011, on his 90th birthday, Boeing's 40-87 building in Everett, WA, the main engineering building for the Boeing Commercial Airplanes division, was renamed the Joe Sutter building. Joe's association with Boeing and aviation as a whole lasted 76 years.

Joe passed away on August 30, 2016 at a hospital in Bremerton, Washington from complications of pneumonia at the age of 95.

Joe not only influenced modern aircraft design and manufacture, but, he also had a lasting impact on Safety and Airworthiness which influences everything we do – even today. The arrival of the B747 not only changed the world, but also the way in which aircraft maintenance is planned and implemented.

The title of "King Maker" or more aptly, in the context of the B747, aviation's very own "Queen Maker", Joe will always have the singular distinction of introducing the world to its' first "Jumbo-Jet" and "Queen of the Sky".



Whittle Safety Award

IFA presents annually The Whittle Safety Award. This prestigious award is nominated by the IFA members and honours the work of Sir Frank Whittle, father of the jet engine. It recognises an outstanding contribution to airworthiness.

2015 Beth Gamble

Our 2015 Whittle winner - Beth Gamble was presented with her medal and certificate during the ASIP Conference, held in San Antonio in December 2015. IFA Vice President - Americas, John Goglia was delighted to travel down to Texas to present the award and was joined by Steve Swift, IFA Vice President - Australasia who had nominated Beth for the award.

The citation reads - 'For a career devoted to keeping the world's largest aircraft fleet - Cessnas - airworthy as they age, by developing a special suite of maintenance programs engineered to ensure Cessna aircraft are damage tolerant, as are large transport aircraft.'

After introducing IFA, John invited Steve to tell the conference's 240 experts in structural airworthiness (Beth's peers) how she had excelled: 'Beth's designed more 'damage-tolerance-based' structural inspection programs, for more aircraft types, for more aircraft in the world, than anyone else! She's wrestled with the engineering challenge of old designs and materials. And, she's stared down the political challenge of industry opposition so strong that her national airworthiness authority relented, leaving her to promote the safety value of her programs alone. She has already been rewarded, inwardly, by her programs finding life-threatening cracks. But, the IFA also wants to publicly honour her persistence, passion and professionalism. Beth has saved the lives of many air travellers!'

Beth's colleagues from Textron have been very supportive and delighted that she has received this recognition for her work. Beth has kindly offered several of her papers to IFA members and these are available on the members page of the website.

2016 Sir Tim Clark

Our 2016 Whittle winner - Sir Tim Clark demonstrated commitment to safety during the period of unprecedented growth of Emirates airline.

The citation reads - 'For demonstrating how to grow successfully a quality multi cultural airline safety brand through exemplary safety awareness & leadership. His outstanding and visionary leadership demonstrates a clear understanding that safety begins with design and rests with all involved in airline operations - including himself.'



The award was presented to Sir Tim by Frank Turner President of the International Federation of Airworthiness and His Excellency Saif Mohammed Al Suwaidi the Director General of GCAA at their joint Seminar on Risk Management held at the Intercontinental Hotel Festival City.

Prior to the presentation, His Excellency Saif Mohammed Al Suwaidi the Director General of GCAA made a keynote address on aviation safety in the region followed by an address by Frank Turner President of the International Federation of Airworthiness on the history of the award, in the name of the inventor of the jet engine, Sir Frank Whittle who he knew personally from his days on the Board of Rolls-Royce plc. He went on to say that the award to Sir Tim was for demonstrating how to grow successfully a quality multi cultural airline safety brand, through exemplary safety awareness & leadership. His outstanding and visionary leadership demonstrates a clear understanding that safety begins with design and rests with all involved in airline operations - including himself.



From left - Captain Nasir Iqbal GCAA, Sir Tim Clark, Mr Walid Ghanim Al Ghaith, Director QRMD, GCAA and Frank Turner, IFA President

IFA Scholarship 2016

After much deliberation the IFA Executive Board chose to present this year's IFA Scholarship award to:

**Ms Nerissa Allen
LAME (Student)
LIAT (1974) Ltd**

Ms Allen used the Scholarship to attend the Cranfield University Course 'Airworthiness Fundamentals' which took place in September 2016. The course addresses the key aspects of design, construction, maintenance and operation of aircraft across the wide spectrum of technologies met in aerospace. It features all aspects of airworthiness from the International Civil Aviation Organisation (ICAO) standards to the European Aviation Safety Agency (EASA) and Federal Aviation Administration (FAA) regulations.

Ms Allen accepted the award and upon returning from the course commented: "I would like to thank the International Federation of Airworthiness once again for the scholarship. I now have a greater appreciation for airworthiness on a whole and would like to wish the Federation continued success as you help offer the opportunity for individuals around the world to have a greater understanding of airworthiness in the field of aviation."



Nerissa at Cranfield University having been presented with her scholarship certificate by Dr Simon Place, Senior Lecturer and Professor John Bristow, Lecturer Cranfield University



IFA FORUM - Hong Kong

Hosted and fully supported by the Civil Aviation Department of Hong Kong IFA ran a very successful 2 day Workshop and Forum in Hong Kong in November 2015. Cengiz Turkoglu, IFA Technical Chairman gives an overview of the key messages to emerge from the discussion.

On the first day of the IFA's Hong Kong event in November 2015, a workshop was conducted and the attendees were asked to brainstorm by using a methodology called 'Nominal Group Technique'. This 3 step approach expected the attendees to work within rather small groups (6-8 People) and first each individual to come up with his/her own ideas (written on post-it notes); secondly to display their ideas on a board and discuss them and finally each individual to rank their top three choices to hand in for the data analysis. The two fundamental questions which attendees focused on during two separate sessions were as follows:

- What are the potential pitfalls of 'Risk Based Oversight' approach?
- What are the most significant risks related to 'Critical Interface between Flight Operations and Engineering/Maintenance'

Critical Interface between 'Flight Operations' & 'Engineering/Maintenance'

All the final responses from the professionals, who participated in this exercise, were shared with all the attendees after the event. The key points, which were presented by the following 'word cloud' during the second day of the event focused on three fundamental areas.

- **POOR, LACK OF or MIS-COMMUNICATION:** There is no surprise that respondents highlighted this issue as one of the top risks. From defect rectification issues during daily operation to much more strategic decisions such as modification programmes, fleet planning decisions related to configuration control etc., poor lack of or mis-communication can break down many of the well-designed barriers in the safety system. Also comments were included about the need for using multiple ways of communicating (i.e. verbal and written) to verify that the typical two-way process works effectively.
- **COMMERCIAL PRESSURE ON BOTH PROFESSIONAL GROUPS:** The commercial pressure was mentioned as a key issue by many of the respondents and it can certainly have an impact on the interface between flight operations and engineering/maintenance departments. Particularly when an AOG situation arises, despite the rules and guidance provided by company's operational manuals (Ops Manual, Engineering Procedures and MEL), certain defects and their effect on the specific operations can be not so easy

- **CULTURAL DIFFERENCES AMONGST DIFFERENT PROFESSIONAL GROUPS:** Professional culture was defined by ICAO (ICAO Safety Management Manual) as one of the three key components impacting on 'Safety Culture' in any organisation. (The other two, being national and organisational cultures) The cultural differences between pilot and engineering communities certainly generate some challenges to ensure a robust interface between them. In some cases the perception of how much each other's contribution to flight safety or who the ultimate decision maker is in certain circumstances can be the reasons for some of the conflicts. Of course, such challenges are not easy to address but leadership commitment to 'close collaboration' can give strong messages to certain dominant individuals amongst the front line operators.

The key points raised by the participants, which were related to the potential pitfalls of 'Risk Based Oversight' can be grouped in three categories.

- **REPORTING CULTURE:** The reporting in certain disciplines in the industry is not as good as others. (i.e. engineering vs flight operations) As a result of this, numerical analysis of data should be considered carefully to avoid only focusing on areas where good reporting culture exists and not having effective oversight on other areas with poor reporting culture and potentially unidentified significant risks.
- **DATA INTEGRITY & ANALYSIS:** Data quantity (lack of data in certain areas/disciplines) and the quality of data (anomalies and inconsistencies within data sets) can be fundamental challenges regulatory authorities face. Also even though there is sufficient data and the quality of data is reasonable, the techniques used for data analysis will always have limitations and may not identify some key risks in the entire complex socio-technical air transport system.
- **LACK OF SKILLS & TRAINING:** In a much more data-driven environment for both the industry stakeholders and the regulators, the required skills for data analysis and risk assessments to identify and focus on the most significant risks are vitally important. Training of staff involved in such SMS processes were raised as a necessity by the respondents.

Overall, the responses highlighted some potential weaknesses in 'Risk Based Oversight' concept. The resource constraints are continuing challenge for many regulators around the world. Achieving effective oversight of a continually growing industry requires some innovative approaches such as 'Risk Based Oversight' as well as sustainable funding models for the regulators' activities including oversight. Of course, the overlap between various oversight activities (i.e. multiple audits /inspections etc.) should also be scrutinised to demand more value from these activities but also we should never forget that the industry has achieved today's remarkable safety record by mainly relying on compliance monitoring. Therefore finding the right balance between rigorous compliance monitoring, which can be burdensome and over-reliance on data-driven approach, which can have fundamental weaknesses is challenging but it is the key to sustain the success the industry has achieved and the enabler for future growth.



IFA Regional Updates

Middle East

Captain Nasir Iqbal, IFA VP Middle East



GCAA - Risk Management Seminar

General Civil Aviation Authority started its series of Risk Management Seminars in 2013. The 5th Risk Management Seminar was held on 17 May 2016 at Inter-Continental Hotel, Dubai Festival City.

The seminar was supported by International Federation of Airworthiness (IFA) from UK and CGE Risk Management Solutions from Netherlands.



The focus of this seminar was on the Risk Management in current aviation environment and integration of safety in ground services organizations. It was attended by over 210 participants from 68 organizations from UAE and foreign aviation industries. All segments of aviation were well represented in the seminar. Our foreign guests travelled from UK, Netherlands, Kenya, Qatar and Bulgaria to participate in the seminar. International speakers and panellists from GCAA, Emirates, IFA, IATA, DNATA, Royal Jet, Ernest & Young and MIR3 added value for the participants. The panels presented their ideas to the audience before embarking on discussions through question and answer sessions.

The seminar also featured a Bow Tie Risk Management Training workshop by CGE Risk Management Solutions for all participants. The workshop helped in understanding fundamentals of risk management using the renowned bow tie methodology.

The seminar also featured participation by academia where students from Abu Dhabi University, Emirates Aviation University and American University Dubai attended the proceedings. Embry Riddle University had its display stall along with CGE Risk Management Solutions, MIR3 and IFA in the exhibition area to educate the audience on the latest information regarding risk management.



Australasia

Mr Steve Swift, IFA VP Australasia



Does your aircraft's maintenance match its mission?

It's a good question, as these reports from the Australian Transport Safety Bureau (ATSB), about two recent in-flight break-ups, remind us:

In-flight break-up involving de Havilland DH82A Tiger Moth, VH-TSG, Final Report, published 21 January 2016



In-flight breakup involving PZL Mielec M18A Dromader VH-TZJ, Final Report, published 15 February 2016.

The cause of both in-flight break-ups was metal fatigue. For the Tiger Moth, it was in an alternative part. For the Dromader, an alternative inspection method may have missed a crack. Aside from those particulars, a common question was whether the 'maintenance matched the mission'. The Tiger Moth often flew aerobatics; the Dromader fought forest fires. Did their maintenance account for those unusual missions for their types? It is dangerous if fatigue cracks form and grow more quickly than

their designers predicted.

What about your aircraft? Is there anything unusual about its operation? Is this question part of your Safety Management System (SMS)?

The answer is not always obvious. It could just be differences in TOW, ZFW, flight time or cruising altitude. If in doubt, ask your aircraft's Type Certificate Holder if they accounted for your aircraft's operation when designing its Instructions for Continued Airworthiness.

How long can the airworthiness continue?

It's a question often asked in the Australasian region. Here, aircraft often work harder than others of their type, so they are often the first in the world to reach mandatory life limits on structure, and limits of validity on Instructions for Continued Airworthiness.

It is understandable that operators are then reluctant to throw away aircraft that still look perfectly airworthy. Sometimes, the Type Certificate Holder will help. But, if not, operators often ask local design organisations to engineer life extensions. Two recent examples are Australian STCs for the Piper PA-31-350 Chieftain and Dornier 228-202. Life extension is not trivial. It involves considerable engineering: for design, certification, inspection and modification. And, if the airworthiness is to continue, so must the engineering. The STC holder must continue to closely monitor their fleet.



Piper PA-31-350 Chieftain



Dornier 228-202 (stripped for inspection and modification)



Asia

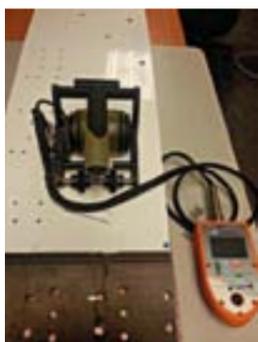
Mr Victor Liu, IFA VP Asia

Challenges in the Asia Pacific Region

The latest forecast of 2016-2035 provided by Airbus SAS shows that the bullish trend of aviation growth in the pre-2016 era will continue in the Asia Pacific Region. It is anticipated that about 13,500 new aircraft will be delivered to the Region within this period, with Maintenance Repair Organisation (MRO) demand service value estimated at US\$ 646 billion. To support such growth, about 217,700 new maintenance practitioners will be required.

The bulk of the aircraft deliveries between 2016 and 2035 will be a mix of new generation aircraft such as Airbus A350, Airbus A320neo, Boeing 787, Boeing 777X and Boeing 737 MAX, etc. These aircraft types share the commonality on application of new generation materials, implementation of new aircraft system concept and use of wireless data-link network between aircraft and ground stations.

With the application of new generation materials, such as carbon composite, the technical expertise required to maintain continued airworthiness of aircraft undergoes major evolution that poses challenge to maintenance personnel. For example, the initial assessment of fuselage damage requires the use of dedicated testing equipment to determine if further in-depth non-destructive testing is required. To allow the assessment to be performed to the highest standards, strict adherence to airworthiness data published by aircraft manufacturer is essential. Aircraft operators and maintenance organisations must therefore provide dedicated training to the technical staff concerned with respect to the application of new techniques, equipment and airworthiness data, including Minimum Equipment List.



Tools used in initial assessment of fuselage damage

Compared with conventional aluminium materials, carbon composite poses the issue of lower conductivity. To restore the conductivity of composite structures, Electrical Structure Network, in the form of conductors running along the length of the fuselage, has to be used. Again, maintaining the continued airworthiness of the network requires dedicated training to the technical staff concerned.

In order to meet future challenges ahead, aviation authorities and industry stakeholders have to work hand-in-hand on complex certification and continued airworthiness issues. Authorities should enhance their licensing and regulatory regimes in terms of competence based requirements for sustainable development. Industry should at the same time be prepared to apply advanced engineering techniques and equipment to the highest standards without deviation. Technical training, whether basic or specialised, will constitute a crucial part in the development of engineering personnel of the next generation.

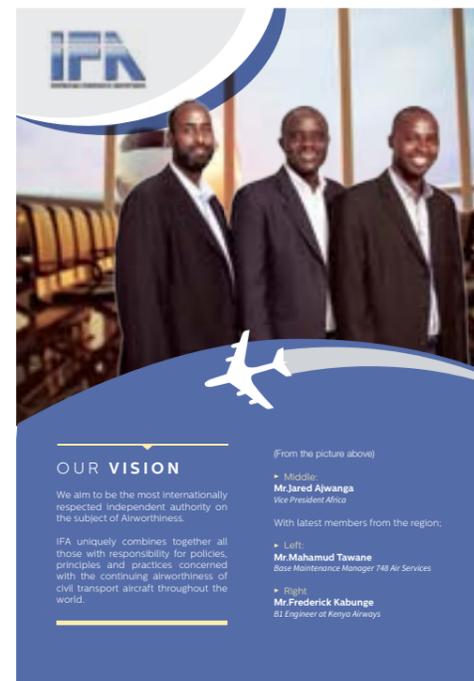


Staff working on Electrical Structure Network (source: Airbus SAS)



Africa

Mr Jared Ajwanga, IFA VP Africa



IFA is pleased to welcome our new Vice President for the Africa Region, Mr Jared Ajwanga. Jared was able to attend both the IFA Forum in Hong Kong and GCAA event in Dubai and is keen to promote Continuing Airworthiness within the Africa Region. "Aviation in Africa is on an upsurge with most industry players now focusing on the region's market than before. Maintenance requirements are equally on a steady rise and the need to entrench SMS compliance is evident.

As IFA we are ready to work with regulatory authorities, maintenance organizations and other industry players at large to safe guard aviation safety in this region. We have embarked on a journey to standardize the local CAA maintenance engineers licences with EASA part 66 license as a first step to improving the industry quality and standards. So far Aero Bildungs Aviation Training Centre from Germany and Resource Group Aviation Technical Training from UK have run successful part 66 modular classes in Nairobi on my invitation. These classes have drawn participants from Mauritius, Indonesia, Uganda, Tanzania and the host country Kenya.

Our membership drive is on, over the past few months the team of IFA members based in Kenya has expanded and we have been delighted to welcome several new Associate members, with more applications being processed as we go to print. We have met as a team and have produced new advertising material which will be distributed shortly. Our goal is to develop information and advise on Continuing Airworthiness issues and in the future to hold IFA Forum events within the region."

IFA at ICAO

IFA volunteer, Dave Lewis continues to attend and contribute to the ICAO Airworthiness Panel (AIRP) meetings. The latest meeting held in Montreal in November 2016 was the fourth meeting of the Airworthiness Panel (AIRP) in the current round. It was convened by the ICAO Secretariat to review the current status and continue to progress the active work programme of the AIRP.



Subsequent to the IFA report of the Third AIRP meeting, ICAO Air Navigation Commission (ANC) has issued a State Letter SP 60/4-16/69. This State Letter included proposals to amend the Standards and Recommended Practices (SARPs) in:

- Annex 1 — Personnel Licensing,
- Annex 6 — Operation of Aircraft
- Annex 8 — Airworthiness of Aircraft and
- Annex 19 — Safety Management regarding aircraft maintenance organizations (AMOs), design Standards and continuing airworthiness.

The ANC have requested Member States to submit their comments on these proposals to the ANC by 16 November 2016.

A summary of the active work programme and status is available to IFA members via the Members page on the IFA website.

Encouraging Positive Safety Achievements

NEW USOAP-RELATED ‘COUNCIL PRESIDENT CERTIFICATES’ TO RECOGNIZE STATES’ COMMITMENTS AND PROGRESS TOWARD EFFECTIVE IMPLEMENTATION OF ICAO SARPs

To more publicly acknowledge global activities and commitments geared toward the Effective Implementation (EI) of ICAO Standards and Recommended Practices (SARPs), the ICAO Council has approved a new ‘Council President Certificate’ recognition programme. Employing a transparent and objective assessment mechanism, the certificates are to be conferred annually upon those States demonstrating 15% or higher EI progress in their most recent Universal Safety Oversight Audit Programme (USOAP) activity, and which have also attained the ICAO Global Aviation Safety Plan (GASP) target 60% minimum EI rating for all Member States.

Consistent with its current objectives and priorities under the ICAO No Country Left Behind initiative, the ICAO Council recently established new Council President Certificates of recognition. The purpose of these certificates is to highlight the achievements of States which have made significant progress in effectively implementing ICAO’s SARPs.

The goal of the Council President Certificates from an overall standpoint is to provide further encouragement to States to meet or exceed ICAO’s minimum targets, and ultimately to make aviation’s global network safer and more secure for the passengers and businesses it serves.

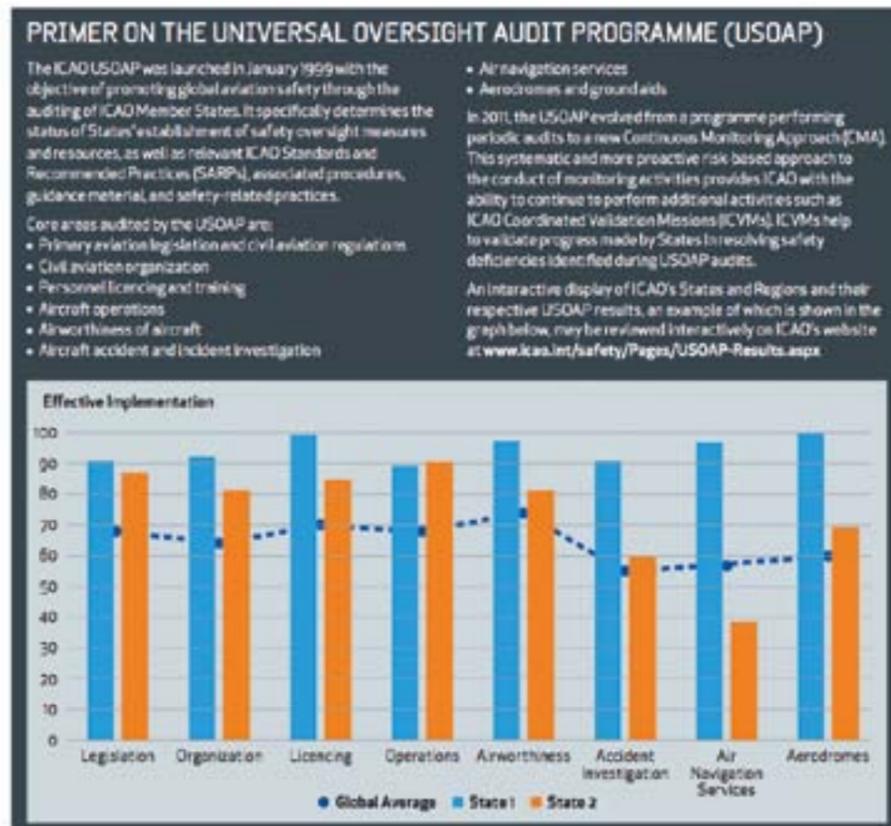
“It is imperative that States and industry establish clear commitments and achieve concrete results with respect to the effective implementation of ICAO SARPs and the significant modernization investments now needed in our network, whether for new air navigation or airport infrastructure,” stressed Dr. Olumuyiwa Benard Aliu, ICAO Council President. “The goal of these instruments of recognition will be to encourage that process.”

CRITERIA CONSIDERATIONS

Council President Certificates’ recipients will be determined through a transparent, objective analysis process utilizing ICAO USOAP results. States selected via the process will be identified once the previous calendar year’s USOAP CMA audit, ICAO Coordinated Validation Mission (ICVM), and off-site validation activity reports are analyzed by ICAO Headquarters in the spring of each year.

In general, eligible States will need to have achieved a minimum 15% positive change in their overall EI rating since their last USOAP CMA audit activity to be eligible for a certificate, in addition to an overall minimum EI score of 60%.

The 60% USOAP EI baseline requirement reflects what is currently targeted as a global minimum in ICAO’s GASP, and any States with an unresolved USOAP CMA Significant Safety Concern (SSC) will not be eligible.



CRITERIA EXCEPTIONS

In light of the fact that this selection methodology may not always result in the selection of an eligible State from every ICAO region, the ICAO Council agreed that the process should be sufficiently flexible to permit the Office of the President some latitude in designating additional recipients.

Therefore, States that have achieved 15% or higher positive change in their EI, but which have not yet attained the 60% target, may still be considered for recognition by the Council to ensure complete regional representation in this process.

PROGRAMME ROLL-OUT

ICAO sent an Electronic Bulletin to all States on 21 March of this year, and will identify the inaugural Council President Certificate recipient States in the coming weeks.

To commemorate the launch of the certificates in 2016, the Organization will hold a special ceremony during the 39th Session of the Assembly this September/October.

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39th ICAO Assembly

The 39th ICAO Assembly held in Montreal in October 2016 achieved historic consensus on sustainable future for global civil aviation. Significant and far-reaching 39th Assembly progress was achieved across all of ICAO’s five Strategic Objectives for Aviation Safety, Air Navigation Capacity and Efficiency, Aviation Security and Facilitation, the Economic Development of Air Transport, and Environmental Protection.

Key Decisions related to safety are:

- Endorsement of the ICAO Global Aviation Safety Plan (GASP) as the strategic direction for ICAO’s technical work programme in air navigation:
 - New edition maintains objectives from previous, focused on effective safety oversight for States and safety management for operators. GASP objectives going forward will be to:
- Continue to work on Safety Management System (SMS) implementation.
- Work with State regulators on State Safety Programme implementation activities, including safety performance measurement.
- Develop safety performance indicators and continue evolution toward predictive risk management once SMS implementation is complete.
- Endorsement of continuation of ICAO’s Comprehensive Regional Implementation Plan for Aviation Safety in Africa (AFI Plan) activities beyond 2016, and within the work programmes of the regional offices, as well as its expansion to cover all safety areas.
- Noted and appreciated ICAO’s progress on items resolved at the last ICAO High Level Safety Conference (2015).
- Endorsement of an ICAO strategy on emergency preparedness and response.

EASA Advisory Bodies and Safety Promotion

by Dai Whittingham, Chief Executive, UK Flight Safety Committee
and is reproduced courtesy of Focus Magazine the official publication of the United Kingdom Flight Safety Committee

Because a large number of EASA actions and proposals directly affect the Member States and the Industry, a series of advisory bodies have provided EASA with a forum for consultation of interested parties and national authorities on its priorities, both at strategic and technical level. Consultation with the advisory bodies covers all aspects of the rulemaking process, and their work includes providing advice on EU-wide safety priorities, strategic and horizontal issues. These advisory bodies are key contributors to the EASA Rulemaking Programme and the European Plan for Aviation Safety.

Prior to decisions taken by the EASA Management Board in December 2015, its work was supported by an EASA Advisory Board (EAB) which included representatives from all sectors of industry, manufacturers and trade associations. Below this level, a Rulemaking Advisory Group (RAG) and a range of Thematic Advisory Groups (TAGs) supported the detailed technical work along with a Safety Standards Consultative Committee (SSCC) and its Subcommittees. The SSCC, which provided advice on strategic rulemaking issues, comprised members from organisations, associations and companies representing those industries, professions and end user groups subject to the Basic Regulation, the implementing rules, certification specifications or guidance material.

The December decisions of the EASA MB established a new advisory body structure that reflected the restructuring of the Agency in 2014 and the establishment of a new Safety Risk Management process during 2015. Two higher-level advisory bodies have been created, with the changes to be implemented in the course of 2016: a Member States Advisory Body (MAB) and a Stakeholder Advisory Body (SAB).

The role of the MAB is to consult Member States on opinions, certification specifications, acceptable means of compliance and guidance material to be applied by them. The MAB is also responsible for provide advice to the Agency on: the content, priorities and execution of its safety programmes; strategic developments; and implementation and standardisation issues of strategic or horizontal nature (including high-level, cross-domain implementation policies, such as the policy on acceptance of industry standards). MAB membership is restricted to representatives of the national competent authorities responsible for applying the Basic Regulation and its implementing rules (such as the CAA), and the European Commission. The SAB role largely mirrors that of the MAB but its membership will reflect a wider representation from industry. More detail on the roles of both bodies can be found in the relevant EASA Management Board Decisions (Nos 19-2015 and 20-2015 respectively) available on the EASA website (1).

Supporting the MAB will be seven Technical Bodies (TeBs) that will focus on specific areas of interest:

- Aerodromes (ADR TeB)
- Air Traffic Management/Air Navigation Services (ATM ANS TeB)
- Air Crew TeB
- Air Operations (Air OPS TeB)
- Production and Continuing Airworthiness (P & CA TeB)
- General Aviation (GA TeB)
- Safety Management (SM TeB)

The TeBs are a forum for consulting Member States on implementation issues and best practices as well as on technical safety priorities when the proposed actions (e.g. issuing safety promotion material or changing existing rules) affect the

Member States. The TeBs will provide advice, through the MAB, on the content, priorities and execution of the Agency's safety programmes as well as on the best way to address safety initiatives such as safety promotion, focused oversight, regulations development, or research. The TeBs will also comment on preliminary impact assessments, rulemaking impact assessments and terms of reference for rulemaking and safety promotion projects, and will be the conduit for developing and providing economic and quantitative data on which the various assessments will be based.

There will be a parallel system of Stakeholder Technical Bodies (STeBs) to support the work of the SAB - this will be important in ensuring that appropriate technical advice is provided to the SAB, as some SAB members who represent trade associations may have limited personal experience of operations. Arrangements are also being developed to allow for joint TeB, MAB/TeB, and joint TeB/STeB, working on areas of common or overlapping interests.

European Strategic Safety Initiative

Launched in 2006, the European Strategic Safety Initiative (ESSI) is an aviation safety partnership between EASA, other regulators and the industry. Consisting of the European Commercial Aviation Safety Team (ECAST), the European General Aviation Safety Team (EGAST) and the European Helicopter Safety Team (EHST), the main task of ESSI has been to enhance safety through the production and dissemination of a wide range of safety promotion deliverables. The UKFSC has been a full participant in ECAST.

In 2015, The Agency implemented a Safety Risk Management (SRM) process. The SRM process includes: (1) Identification of Safety Issues, (2) Assessment of Safety Issues, (3) Definition and Programming of Safety Actions, (4) Implementation and follow-up of the actions and (5) the Measurement of the performance of the safety actions. The ESSI teams were involved in all the SRM key steps but the teams were working to certain degree in isolation from the activities of the Agency as well as other activities by Member States and the Industry. At the same time overlaps existed to the advisory bodies (formerly RAG/SSCC) and it became apparent that some degree of streamlining was required to increase the efficiency and effectiveness of the consultation process.

It has therefore been decided that the ESSI work would be merged with the new advisory body system, principally by establishing new Collaborative Analysis Groups (CAGs) that would draw on the expertise and membership of the existing ESSI teams. These CAGs will receive data from the Member States Network of Analysts (NoA) as part of the process to identify safety risks and emerging safety issues, and will help to align and integrate the identified risks and issues with the European Safety Risk Portfolio. The CAGs will be approximately 25-strong and will be domain-specific; the UKFSC has been invited to participate in the CAT CAG.

As the ESSI teams only had limited NAA participation, EASA is creating a Safety Promotion Network which aims to ensure that material is shared and disseminated among all Member States. Consisting of NAA SP professionals, the network's activities will include sharing material produced at national level, reviewing and agreeing dissemination actions for Safety Promotion material produced at EU level.

Safety promotion is being given much greater prominence than hitherto, and will become a recognised instrument to address safety risks alongside Rulemaking and Oversight. Where possible, safety promotion will be used instead of regulation, via the use of safety notices, recommendations and other material to promote best practice. Clearly, regulation will still be necessary for some issues but safety promotion activities will be used to bridge the time gap between identification of an issue and completion of any associated Rulemaking task. Based on a common Safety Risk Portfolio (SRP), the safety promotion and rulemaking programmes will be developed in a consistent manner as integral part of the European Plan for Aviation Safety (EPAS)(2).

EASA EHFAG Update

by Paul Merrick



Table 1: The role of advisory bodies in European safety risk management – safety promotion focus

Steps European safety risk management process	Key tasks	Advisory Bodies and Technical Groups
Identify safety issues	Suggest candidate safety issues	CAG (Collaboration and Analysis Group)
Risk Assessment	Review the European Safety Risk Portfolio (SRP) from operational/practical perspective Support safety analysis and risk assessment of safety issues for the SRP Propose candidate issues and candidate actions.	
Deciding on mitigation	<i>Discuss priorities and strategic orientation</i> Review and discuss strategic orientation Review and discuss structure and priorities of the RMP and EPAS Propose members for safety promotion tasks groups	SAB (Stakeholder Strategic Body)
	<i>Discuss concrete actions</i> Review and commit to concrete actions addressing safety issues (e.g. lithium batteries). <i>Propose members for safety promotion task groups</i> Approve the composition of Safety Promotion task (SPT) groups. Approve the material developed in task groups.	STeB (Stakeholders Technical Body)
Implementation (Safety promotion)	<i>Develop Safety Promotion material</i> Develop or edit safety promotion material on specific issues (e.g. lithium batteries). Limited duration. Scope defined by TeB/STeB. Lead can be with EASA or NAA or Industry/Community.	Safety Promotion Task (SPT) groups
	<i>Suggests and provides subject matter experts for the SPT groups.</i> <i>Best-practice review and dissemination of safety promotion material</i> Communicate and disseminate safety promotion material. Comment on safety promotion products produced by the SPT groups Provide experts for safety promotion tasks.	Safety Promotion Network

For the other ESSI elements, no sub-SSCC helicopter-specialist committee existed previously and so a new STeB (Helicopter) will be created, based on the current EHEST core team. There will also be a rotary CAG to support its efforts. The membership and business overlaps between the old Sub-SSCC GA and the EGAST core team will be addressed by a merged grouping that will allow a GA CAG to support the GA STeB. As outlined above, the ECAST work will divide between the STeBs and the CAT CAG.

It will be some time before the new working arrangements reach full capacity and some further revisions of the process may be required in future. The advisory bodies will have a key role to play in ensuring that EASA only regulates when necessary, and that safety promotion activities are coordinated and used appropriately. It will be incumbent on EASA to heed the advice developed by the Member State and Stakeholder Advisory Bodies; it will also be incumbent on industry to continue to support the collaborative approach now being developed.

(1) <https://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-19-2015-ms-advisory-body-mab> and <https://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-20-2015-stakeholder-advisory-body-sab>



EASA moved to their new address on 6 June and is continually undergoing development and process / changes to implement the emerging concept of Risk Based Oversight (RBO)/ Performance Based Oversight (PBO) using safety management principles in all regulatory oversight activities.

The EHFAG activities have been “on hold” whilst this has been happening, on 4 May there was an EHFAG strategy meeting hosted by EASA involving key stakeholders in shaping the way forward.

The agenda of the meeting included...

- An update on the European Safety Risk Management Process
- Redevelopment of the European Level support group structure (MAB/SAB, evolution from SSCC to STeBs, closure of ESSI and implementation of the Collaboration Analysis Groups (CAGs)),
- Safety Risk Portfolios and particularly human factors (HF) Safety Issues.
- Internal EASA reorganisation of HF Activities.
- Formal establishment of internal EASA HF organisation
- Brainstorming on the Future.
- How HF related Safety Issues can be integrated in the context of the CAGs, linked to task groups on actions for the EPAS (Rulemaking, Safety Promotion, Research) and integration of HF in the Safety
- Aviation Forum for Europe (SAFE)
- A roadmap for how to get to desired destination

Whilst it is not possible at this stage, to clearly define the “end game” outcome, it is now clear that the existing role and function of EHFAG will continue but will be differently structured and managed to align with the future of EASA’s safety risk management approach and the European Plan for Aviation Safety (EPAS).

EASA are evaluating how to move forward and link the EHFAG output directly to the new concept of CAGs, safety risk management, SAFE (Safety Aviation Forum for Europe). Efforts and output from the EHFAG have been significant and relevant, however these were previously not visible to the directorates’ management due to the lack of formal structure and process.

EASA appear keen to have a collaborative relationship with industry, and a continued involvement of, and alignment with the Federal Aviation Authority (FAA) on approaching Safety Management Systems (SMS) and HF, (HF being seen as a significant part of safety management). The IFA will have a part to play in the future as we are a voice that is heard and respected in the area of initial and continuing airworthiness and maintenance.

The new CAGs will be part of how EASA involve and relate to industry. They will be small enough to manage but large enough to be representative and effective. Their Terms of Reference (TORs) will be task focused with safety improvement and be safety data (Data4Safety Project) driven.

Proposals are now being made to have new TOR’s drawn up for a rebranded EHFAG function which may include a “challenge” function and alignment of the groups TORs to dovetail into the future EASA organizational safety risk management and EPAS process.

In summary, there is still work to be done in finalizing the detail but there is a confirmed will and direction from EASA on this. IFA will continue to work with EASA and the group to achieve the right safety goals.

Implementing a Regulatory Safety Management System to Enable Performance -Based Regulation

The UK CAA journey so far...

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 performance- and 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 Performance-Based Regulation (PBR). 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 PBR, 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 airlines, airports and other organisations. The Regulator's task is to identify where safety 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

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 Performance-Based Regulation 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.

For more information on Performance-Based Regulation and U.K. CAA PBR training, please visit: www.caainternational.com/pbr

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The FAA “Compliance Philosophy”

Today’s Approach to Regulatory Compliance and Continuing Safety*

By Dr. Bill Johnson

Chief Scientist and Technical Advisor for Human Factors in Aircraft Maintenance Systems

Introduction

“Speak softly, and carry a big stick.” That expression, reportedly modified from a West African proverb, is attributed to US President Theodore Roosevelt in 1902. He advocated peaceful negotiated solutions before resorting to conflict. The “Speak Softly” concept, if adhered to, is a very good one. Today, FAA has moved the “Big Stick” to the background. FAA is promoting a Compliance Philosophy” based on cooperation, communication and trust between government and industry. The goal is achievement of regulatory compliance without excessive enforcement action.

An Enlightened FAA Approach to Regulatory Compliance

I have about 50 years of aviation experience, including 12 years at FAA. Throughout 50 years I could not have anticipated the current progressive FAA approach to safety. As a longtime safety professional I am seeing and increasingly appreciating a regulatory organization that is trying to do “the new right thing” to ensure that regulatory compliance and safety are mutually inclusive. The new approach and attitude extends from the top Administrator to the field personnel and support staff that interact with all segments of the industry. The article offers an opportunity to explain the process and to express my professional pride in the initiative.

Was FAA Really Watching Me?

For the first decade or two of my aviation career I saw the Federal Aviation Administration as the aviation police. They tested me and issued my flight and maintenance certificates. The FAA would oversee me with activities like a ramp check or to conduct a review of the approved 141 or 147 curricula of which I was a student and later an instructor. Quite frankly, I did not see the FAA inspector as a partner who could help me to insure safety. In fact, as a pilot/mechanic/ Part 147 instructor I never really saw the FAA. Most likely, I may have thought they were “watching.” Well, they were watching, but not directly. They were providing regulations and guidance material with the hope that I would wisely adhere in an effort to be safe.

The FAA regulations and guidance helped to ensure that my training met a certain standard. The regulations also guided me to maintain a level of currency/proficiency as I flew/maintained aircraft. Most of the time, it was straightforward to comply with the rules. The implication was: if I was legal than I was safe. I came to understand that minimum compliance with the rules was not a guarantee of the highest level of safety. Good certificate holders and organizations always are able to find ways to go beyond the rules to achieve continuing safety and operational efficiency. That’s what Safety Management Systems (SMS) are about. SMS permits individuals and organizations to identify and address the hazards that may affect safety.

I also began to understand that unintentional non-compliance with a regulation, while undesirable, did not necessarily breach acceptable levels of safety in most cases. Of course, such non-compliance, if discovered, would result in a Letter of Investigation, with likely regulatory action. Fortunately, FAA discovery of non-compliance never happened to me. But, any honest certificate holder would admit that they probably forgot to adhere to a regulation at some time in their maintenance or flight history. The old FAA would “Bust” them. The new FAA does not “Bust” someone as the first course of action. That’s called the current “Compliance Philosophy.”

FAA Compliance Philosophy and Safety Management Systems

The current FAA “Compliance Philosophy (see Order 8000.373, June, ‘15) is straightforward. An excerpt from that order says:

“... When deviations from regulatory standards do occur, the FAA’s goal is to use the most effective means to return an individual or entity....to full compliance and to prevent recurrence.

...FAA recognizes that some deviations arise from factors such as flawed procedures, simple mistakes, lack of understanding, or diminished skills. The agency believes that deviations of this nature can most effectively be corrected root cause analysis and training, education or other

deviations of this nature can most effectively be corrected root cause analysis and training, education or other appropriate improvements to procedures....”

Now, if I did not know better I would think this language came from our human factors classes for the past 25 years. It sounds like fair and just culture. When Administrator Huerta briefed this concept to the FAA workforce, in July 2015, he was very serious about the concept, stressing that our best way to ensure compliance may not be by strict enforcement. He said that the traditional enforcement action must not be the first choice to insure regulatory compliance. He did stipulate that we are not ceasing enforcement action but trying to apply it to the extreme cases of noncompliance.

The guidance material for FAA Aviation Safety Inspectors is in Order 8900.323. This Order explains how an Aviation Safety Inspector is approaching the new Compliance Philosophy. It also stipulates how serious FAA management is about supporting the Inspectors who embrace this new approach to compliance. Sample guidance says:

“...the Aircraft Flight Standards approach to oversight and compliance is evolving to stress an engaged, solution-oriented, outcomes-based approach. The goal is to identify deviations from standards and correct them as effectively, quickly, and efficiently as possible... This approach will more effectively address inadvertent deviations and conserve FAA enforcement for intentional, reckless, criminal, and uncooperative behavior....Accordingly, AFS leaders, managers, and supervisors will support inspectors when they use critical thinking to exercise sound professional judgment and take actions in accordance with this notice.”

This new FAA attitude will take some time to evolve. During the initial year both industry and FAA inspectors are accepting the cooperative intent of CP. The data are not currently available to measure impact of the new policy. Certificate holders and inspectors must continue the search for new and improved methods for open communication and joint efforts to solve challenges. This will not happen just with an Administrator’s Order. It will take time. But, it is happening.

Necessary Process and Attitude for Compliance Philosophy to Succeed

FAA acknowledges that the complexity of today’s aviation environment is at a point where further safety improvements cannot be achieved merely by “simple

compliance with prescriptive rules”. All segments of the industry must move forward with effective ways to identify hazards and manage their respective risk. Enlightened inspectors will evolve to base enforcement action not merely on strict adherence to rules. Instead, inspectors will work with industry to determine how new processes and practices are quantifying safety performance and understanding the best opportunities for improvement.

The hide and seek games played by industry and FAA must become a non-competitive engagement, where success and failure is shared by the industry and the government. Again, the industry, including every certificate holder, must apply a process to identify and then address personal or organisational hazards. Voluntary reporting of safety hazards, or even minor violations, must become a norm. In order for that to happen FAA will continue to respect voluntary reports and not use them against the reporters. The current FAA Aviation Safety Reporting System (ASAP) is the very best example of industry and government to identify hazards, reduce risk, and share the lessons learned.



Figure 1. A Compliance Philosophy Handshake

Figure 1 characterizes the FAA attributes/actions/attitudes necessary to make the “Compliance Philosophy” work. On the left side of the pictures is “the FAA.” “The FAA” is not a nebulous tightly integrated organization but, instead, it is diverse group of humans with names like Marie, Juan, Klaus, Jack, and Jacqueline. Those individuals must exercise critical thinking. They must rely on a lot of aviation experience to apply consistent good judgment. They must be fair and just and recognize that voluntary reporting and self-disclosure are “history” if they violate trust. While each FAA Inspector applies these principles the larger organization must support the reasonable Inspector actions. FAA, as an organization, must have

interdependence where inspector/employees talk about just culture, fairness, and critical thinking as they consider operators, engineering/maintenance, and flight operations. FAA managers must support Inspectors that trade immediate enforcement action for critical thinking and just culture.

The right side of Figure 1 characterizes the industry organisational or individual worker attributes/actions/attitudes necessary to make the “Compliance Philosophy” work. Most importantly, they must adopt and wear the fundamentals of SMS on their proverbial sleeve. They must apply the techniques, like Threat and Error Management and Safety Risk Assessment, to understand and address the hazards that can contribute to personal or organisational risk. Like FAA, companies are comprised of individuals all of whom must buy into the safety culture. Individuals must capitalize on voluntary reporting with such programs as the Aviation Safety Action Program, Line Operations Safety Assessments, and more. Organizations must continue to document and promote the value of employee participation in safety. That contributes to the success of the Compliance Philosophy. Instead of expecting an FAA visit for enforcement companies should welcome the regulatory visit as an opportunity to laud the success of corrective actions since the last visit.

How to Capitalize on the New Compliance Philosophy?

The answer to the question depends on your role and segment in the industry. The International Civil Aviation Authority (ICAO) recommends that civil authorities and those whom they regulate have a safety management system. Authorities must comply with ICAO or have a darn good reason that they cannot. The world aviation authorities and industry is complying. The FAA SMS Regulations and Guidelines are posted at (www.faa.gov/about/initiatives/sms/). Airline Organizations (Part 121) or MROs (145) doing work for the airlines, are already high on the learning curve. They know about risk assessment, root cause analysis, and receive regular updates and training from your companies. Other enlightened operators and individuals are adopting safety management system practices not only to prepare for evolving regulations but also to ensure continuing safety and increasing operational efficiency.

When industry is able to “talk and walk the talk” surrounding safety management they can expect many positive things to happen. Here are two. First, it diminishes the chance that they will have non-compliance issues with the FAA inspector. Second, a documented approach to personal and organisational safety management will

help ensure that intended execution of the Compliance Philosophy, should a non-compliance issue arise. Finally, I cannot talk about this Compliance Philosophy and SMS without mentioning “Safety Culture.” I believe that FAA has a very good Safety Culture. It is clearly a corporate value that is expressed at the top and practiced throughout the organization. FAA employees can tell you their role and activity that supports continuing safety! The Compliance Philosophy is only one example how FAA is trying to reinforce and formalize the safety culture that permeates our industry.



** Dr. Johnson has spoken about this topic on numerous occasions and has published similar articles in the FAA Human Factors Quarterly Newsletter (V3, Issue 4, December 2015) and in Aviation Maintenance Technology Magazine (January 2016, p 40-41).*

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The overall goal of Aviation Maintenance human factors research is to identify and optimize the factors that affect human performance in maintenance and inspection.

www.faa.gov/about/initiatives/maintenance_hf/

Next Generation Maintenance Human Factors

by Andy Evans, Director, Aerossurance Limited
July 2016

In May 2015, the Royal Aeronautical Society held a seminar on ‘Human Factors in Engineering - the Next Generation’. The theme of the conference was engaging the next generation of maintenance personnel in maintenance HF. However, in his opening address Professor Dave King talked about how even after a generation of attention on maintenance HF, similar occurrences were still repeating with momentous regularity. King highlighted that as well as thinking about the next generation in the industry we also need to think about a next generation approach to human factors in engineering. Over the last 10-15 years, much attention has been focused on maintenance human factors training and reporting & investigating errors. While we could concentrate on simply doing more of these and certainly can find ways to do these things better, perhaps the next generation approach needs to include a much wider range of activities.

In CAP1145 the UK CAA commented that: “Human Factors training alone is not considered sufficient to minimise maintenance error. Most of the [contributing factors] can be attributed to the safety culture and associated behaviours of the organisation” (emphasis added). In their report on a double engine cowling loss at London Heathrow, UK AAIB commented that routine HF continuation training was not providing “effective tools”.

Reliance on ‘easy’ traditional actions (e.g. warning decals, extra procedures, safety notices and repetitive PowerPoint based classroom training) is not enough. Failing to learn from incidents that have happened to others while waiting for you own people to make errors are not good enough either. As an industry we need to be better at eliminating hazards in the design and planning stages. Equally learning of the misfortune of others is not the same as learning from it AND putting improvements in place.

At the conference the RAeS Human Factors Group: Engineering discussed results from an online survey that suggested a need to:

1. Share data better across the industry.
2. Integrate HF more fully into Safety Management Systems.
3. Get better at actually implementing improvements.

A New Approach?

Perhaps we should first start by treating maintenance personnel more like athletes who need to achieve peak performance every day.

British Cycling has gone from a historically rather lacklustre performance, for example winning two bronze medals in the 1996 Olympics, to producing spectacular performances. By the London 2012 Olympics, Britain was ranked number one in the world and British riders won 12 medals, including 8 of the available 14 gold medals. The same year Sir Bradley Wiggins became the first Briton ever to win the Tour de France, a feat repeated in 2013 and 2015 by Chris Froome.



There have been many reasons for this, not least the availability of National Lottery funding to support deserving British sports. However, this success is not just due to investment, but to talent, individual commitment and a highly effective strategy for improving performance. Much of the latter has been credited to Sir Dave Brailsford, first performance director of British Cycling (until 2014) and since 2010 general manager of Team Sky.

Continuous Improvement

Brailsford, who describes himself as a conductor not a manager, says:

Sport is about continuous improvement, it's about getting better... You... might say 'we can't think how we're going to make this any better'. But ultimately you can... We've got to keep looking, researching and working – trying things.

One of the more quotable examples is his concept of 'marginal gains'. Brailsford advocates a near obsessive attention to detail, to focus on every element that can affect human performance, seeking out opportunities to make small improvements, that collectively lead to noticeable performance improvement.

A continuous search for improvement opportunities to help maintenance personnel produce peak performance would certainly be more proactive than solely relying on retrospective analysing submitted reports of occurrences, errors or hazards.

It might sound like heresy, but at an industry perhaps we rely too much on submitting safety reports 'to the management' or to 'specialists' on what has or might go wrong and not enough in involving everyone in continuous improvement.

Compliant or Complacent?

Some might scoff at the suggestion that there are lessons aviation can learn from sports. They may well roll-out the axiom that 'aviation is a highly regulated industry' and use this as an excuse to undermine improvement. Too often in aviation this means that compliance with the minimum standards of regulation is accepted as sufficient.

Sports are not free from regulation. Sporting regulations are primarily about ensuring fair and consistent competition. Cycling, like several other sports, also offers us lessons on individual accountability. US cyclist Lance Armstrong, seven time Tour de France winner, was subsequently banned from the sport in a damaging doping scandal. Extensive efforts are put into ensuring drugs cheats who violate the fundamental rules of sportsmanship are detected and held accountable.

Athletes need to understand how they can inadvertently take performance enhancing substances that have been prohibited. However, it would ludicrous to suggest that a detailed knowledge of the regulations will facilitate sporting victory. In aircraft maintenance, so much training and consultancy is built around regulations and compliance that perhaps it is no wonder that innovative improvement suffers. Sometimes one even wonders if innovation is seen to be a threat to training material and off-the-shelf consultancy models!

In every sporting contest errors occur in preparation and in tactics resulting in sub-optimal performance, potentially making the crucial difference between victory and defeat. In competitive sport these have to be openly acknowledged and seen as opportunities to learn and improve.

Management consultant Yves Morieux of BCG commented in a TED Talk on business generally:

If you think about it, we pay more attention to knowing who to blame in case we fail, than to creating the conditions to succeed. We are creating organizations able to fail, but in a compliant way, with somebody clearly accountable when we fail. And we are quite effective at that: failing.

Being More Systemic

Its highly likely that any aviation professional reading this quote will see the word 'blame' in the first sentence and smugly think 'but aviation is better than that, we believe in a just culture not one of blame!' Indeed, that is an important fundamental concept in enabling an open dialogue and continuous improvement.

However, many just culture policies and procedures are primarily focused on suspiciously judging individual performance. These bureaucratic mechanisms are applied to individuals not the system, with the potential to inadvertently reduce trust rather than enhance it. The circumstances that influenced an individual's performance are seen as factors that mitigate culpability rather than systemic opportunities to improve. Inappropriate use of these mechanisms help normalise failure at the expense of collective improvement.

Questions organisations have to ask are:

- Are we over-emphasising formal reporting at the expense of open, continuous and proactive dialogue?
- Are we applying our just culture process (i.e. judging culpability) too often and just highlighting we don't trust our own people?
- Do we spend as much time on optimising our process for improvement?
- Do we value continuous improvement more than compliance with the status quo?

In a modern car factory, when a problem is discovered workers are expected to 'pull the andon cord'. This effectively stops the problem progressing to the next work station unless it is fixed and at that point the entire production line will stop. The readily accessible cord (or button) is not so much a way to report a problem but more a signal for help to collaboratively solve the problem (andon is Japanese for lantern). In an efficient and well standardised plant producing 2000 vehicles a day there can be as many as 5000 andon pulls per day! Each one is an opportunity to make a small incremental improvement ('marginal gains') and it's a supervisory responsibility to escalate those that need wider action, such as a design change.

More than Maintenance

Maintenance Human Factors are more than factors within maintenance organisations and continuing airworthiness management organisations. Design Organisations shape both the products being maintained and the supporting data. In the last few years UK AAIB have published a number of reports that highlighted maintenance tasks that are vulnerable to human error.

In the case of the loss of engine cowlings mentioned earlier, over 30 other in-flight cowling losses have occurred on the same aircraft type, despite a number of comprehensive and well documented safety investigations having been published. In drafting a Special Condition for future engine cowlings EASA noted that designs can be expected to cope with abuse they should "minimise the risk associated with the normal maintenance practices in the current airline environment".

In another case, in which an actuator was installed inverted during a relatively rare task, in response to a Safety Recommendation the manufacturer responded:

The recommended technique for manoeuvring the actuator into or out of the installation location are [sic] not included in the AMM. The AMM is a procedural manual that assumes the maintenance called for will be performed by qualified mechanics who have received training in the use of the required tooling and in the maintenance techniques that may be necessary to complete the procedure.

This rather unhelpful response could be paraphrased as:

- "we do have a technique but we don't put it in the AMM"
- "our 'procedures' aren't intended to actually tell you how to do the job"
- "we assume that if parts are incorrectly installed the maintainers haven't been trained adequately"

The AAIB concluded that the correct orientation of this actuator is not obvious and there was no suggestion in their report of a lack of qualification, competence or motivation amongst the maintainers involved, who were employed by a reputable major airline.

The RAeS has crafted its 'First Eleven' guidance on how designers can integrate the best practices for maintainer-centric design into their design process.

Risk Culture: The missing link in Safety Culture Debate?

by Cengiz Turkoglu
IFA Chair of Technical Committee and Senior Lecturer, Cranfield University

The Background & Introduction

The ICAO Safety Management Manual (Doc 9859) and many other guidance materials published by the regulatory authorities around the world refer to models and frameworks such as '4 Components of Safety Culture' (Prof. Reason), 'Culture Ladder' (Prof. Hudson) and 'Just Culture' model (Dave Marx). As a result, the stakeholders in aviation have so far considered only these perspectives in terms of measuring, assessing and developing their safety culture.

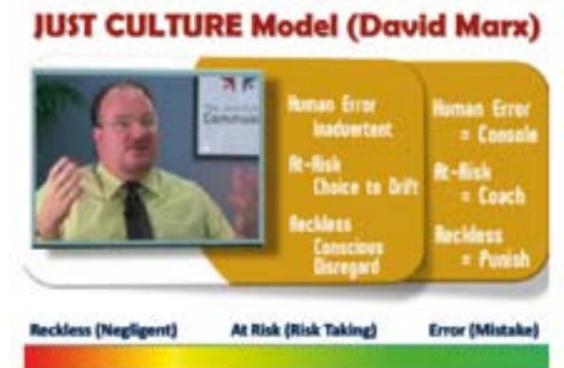
For example, what/how risk decisions are made by front line operators and if senior management is presented with the same risks accepted by front line staff, would they take the same/similar decisions? In other words, have different groups in different levels in organisations more risk averse or more risk taking attitude than each other? If so, what does it mean from a safety perspective as well as for the overall business? It can be argued that these kinds of questions are not addressed by the existing safety culture frameworks.

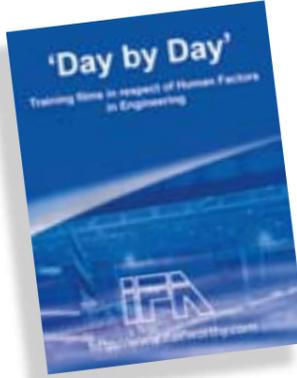


However, to really make progress managing Maintenance Human Factors, we need a collaborative effort between designers and maintainers.

In Conclusion

As an industry we need to put a greater emphasis on collaborative improvement if we are to break the cycle of repetitive failure and use a wider range of techniques than traditionally.





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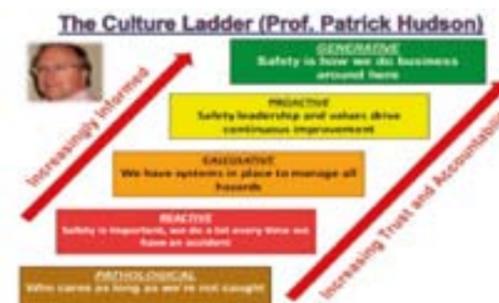
Could it happen to you? If not - why not? If yes, what can you do about it? With the guidance of Prof. Reason the film suggests the way forward.



Safety Leadership - An Airline President’s View

An interview with Sir Tim Clark, President of Emirates Airline, focusing on leadership from the top.

While these models are valid – and when effectively applied – they can have significant impact on organisations’ safety performance, it can be argued that they seem to be very much focused on collection of past event data, which is inevitably backward looking and they do not specifically aim to explore how risk is perceived and managed at different levels in organisations.



‘Risk Culture’ – on the other hand – has been studied and recognised as an important part of organisational culture, in other risk oriented industries such as financial institutions as well as some safety critical industries. Additionally the role of ‘risk culture’ in overall risk management process is recognised within the ISO 31000:2009 ‘Risk Management – Principles & Guidelines’, which is not a certification standard but used as a guideline by many organisations. The main idea of this study derives from the ‘Risk Culture’ guidance material produced by the Institute of Risk Management (IRM, a UK based non-profit organisation), in order to support the implementation of ISO 31000:2009. The term ‘Risk Culture’ is not well known or regularly discussed by airline and/or MRO industry safety practitioners, but it has the potential for integration within the existing ‘Safety Culture’ models currently applied in the commercial air transport industry. Investigating how risk is perceived and managed across the organisations (in different disciplines/

departments i.e. flight operations, engineering etc.) and understanding some of the common themes on what/how risk decisions are made, can help to develop a 'Risk Culture' assessment tool.

The concept of 'Risk Culture'

The idea of introducing 'Risk Culture' as a new component of 'Safety Culture' may potentially have a number of benefits. The question of 'how much risk is excessive' will always be subjective just like the non-existing line between 'risk taking and reckless behaviour' (Dave Marx Just Culture model). Nevertheless if the front line operators are taking risks based on their perception and certain circumstances, and these are not acceptable to the line or senior managers, then there will be opportunity to address underlying causal factors (systemic issues) and/or giving clear messages about the unacceptable risky behaviours. Furthermore in some countries or organisations, the degree of 'can-do attitude' can be a driving force for excessive risk taking because people genuinely care about their employer and they believe that they are saving the day (i.e. releasing or accepting an aircraft with a 'not clear cut' defect in order to avoid huge cost driven by a technical delay.)



Clarification of 'Acceptable' & 'Unacceptable' risks (however subjective and difficult it may be) can enable proactive application of 'Just Culture' policy in an organisation. Because collecting data on 'accepted vs rejected risks' may give managers the opportunity to identify any potential 'excessive risk taking' by front line operators so that risks unacceptable to the management can be clarified/addressed and such behaviours can be hopefully avoided before an actual incident occurs. Otherwise, those who accept some level of risk in their

operational environment may not realise that their actions are not acceptable to the management and they continue 'getting away with it' until it ends up with a bad outcome and then this will likely lead to a disciplinary action. Subsequently the management who may eventually take disciplinary action also has to take the difficult decisions whether to try to justify the decision taken by communicating with the whole workforces or let the rumours go around in the organisation (i.e. whether the disciplinary action was justified or not) The adverse impact of 'taking disciplinary action' on particularly reporting culture (mature reporting i.e. reporting of own mistakes) is most probably inevitable in many organisations. The concept of 'Risk Culture' may proactively identify such issues and address them by organisational development and learning.

The discussion on Measuring vs Assessing/ Evaluating Safety and or Risk Culture

There are a number of safety culture measurement/ assessment tools such as 'Aviation Safety Culture Inquiry Tool' (developed by NLR) and 'Safety Culture Indicator Scale Measurement System' (developed by Terry L. von Thaden & Alyssa M. Gibbons @ University of Illinois at Urbana - Champaign) These tools aim to collect quantitative data from the respondents by asking them likert-type questions i.e. how strongly they agree or disagree on certain statements related to key dimensions of Safety Culture. The use of such tools can certainly be valuable and it can enable the management of an organisation to conduct such surveys to identify areas for improvement, take necessary action and then conduct the survey again to verify if the actions taken were effective. This approach aligns with Deming's PDCA (Plan, Do, Check, Act) cycle, which ultimately aims 'Continuous Improvement'. However the concept of measuring culture can also be controversial.

There are many attempts to define the term 'Culture' as well as 'Safety Culture'. However it is inevitable that these definitions vary and can be subject to debates. In one of his speeches, charismatic ex-leader of Southwest Airlines, Herb Kelleher, described the term culture as 'DEFINITIONALLY ILLUSIVE'. Also the well-known social scientist Geert Hofstede, who has been researching culture for decades, defines it as 'UNWRITTEN RULES OF THE SOCIAL GAME'.

let's not try to measure culture

"Not everything that counts can be counted, and not everything that can be counted counts"

W. B. Cameron (widely attributed to Albert Einstein)

Source: This quote was used by Dr. John Carroll, MIT Sloan School of Management at the NTSB's 2 day event on Safety Culture 10-11 September 2013

So it can be argued that measuring culture may not be realistic and perhaps the term assessment or evaluation of the culture with a more qualitative approach can be equally powerful compared to quantitative approaches previously mentioned. Because whether measuring (quantitatively) or assessing/evaluating (qualitatively) approach is used, the ultimate aim is to identify areas for improvement for the management to take action. Today's modern management techniques very much focus on 'performance monitoring' including the use of 'key performance indicators' (KPIs), but there are also sceptics about their use. It is worth remembering that Deming, who transformed the Japanese automotive industry after the WWII by introducing the 'Statistical Process Control' (SPC), also argued against the notion 'if you can't measure it, you can't manage it'. In his book, '7 Deadly Diseases of Management', he described one of the fundamental costly myths as the "Management by use only of visible figures, with little or no consideration of figures that are unknown or unknowable." Perhaps it can be argued that KPI's related to safety culture can be included in this category.

Assessment of 'Risk Culture' in Organisations: A Simple Qualitative Approach

A scientific approach to measure 'Risk Culture' in organisations can be developed by the introduction of a scale system but perhaps a simpler and equally powerful approach to assess the 'Risk Culture' can also be achieved by using a '3 step approach' and asking qualitative questions to enable respondents to share their experiences on the 'MOST SIGNIFICANT RISK DECISIONS' they made.

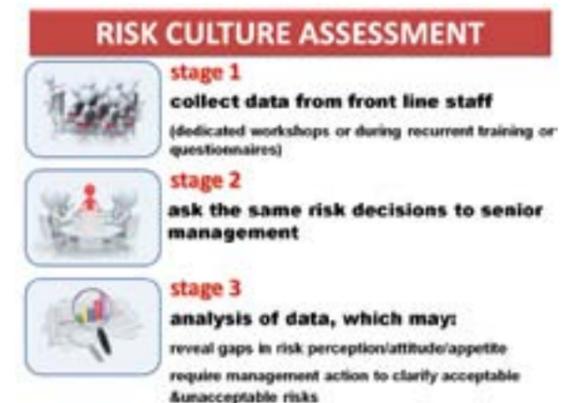
There is no doubt that there are certainly some challenges and limitations of such an approach and how much it can achieve. To start with, asking the respondents about the risk decisions they made can be a barrier for how much

2 fundamental and difficult questions (MOST SIGNIFICANT RISK DECISIONS)

- 1 A scenario & decision 'accepted/acceptable risk'
- 2 A scenario & decision 'unacceptable/rejected risk'

they are willing to share; therefore the use of different methods for data collection (through workshops, training sessions or questionnaires) should be considered.

Also the subjectivity of risk creates a challenge amongst the front line operators as well as between the management and the front line operators. Nevertheless identifying differences in 'RISK APPETITE' should initiate healthy discussions in the organisation and this proactive approach may ultimately result in beneficial outcomes such as addressing the causal factors encouraging risk taking through organisational learning and development.



Industry-wide '1st Risk Culture Survey'

After conducting two workshops during the internal safety events of two different operators (one in the Far East and the other in the EU), at the beginning of April, I launched the 1st industry-wide 'Risk Culture Survey' questionnaire to collect data from pilots, engineers and their managers. The questionnaire is mainly about two fundamental questions. 'Accepted/Acceptable Risks' and 'Rejected/Unacceptable Risks' and the factors encouraging professionals to take risks but also expects the respondents to share their

experiences and observations about mitigation strategies. So far I received just under 150 responses. Although the response rate has been disappointing and perhaps the results may be statistically insignificant, I am delighted to see some very interesting and enlightening responses from pragmatic point of view. The questionnaire can be completed anonymously but one of the ways I tried to increase the number of respondents was to offer the opportunity to enter a bursary draw to attend a professional course at Cranfield University if the respondent is willing to provide an email address. This will also give me the opportunity to be able to collect data from the same population every year as I aim to conduct a longitudinal study, which hopefully will enable us to identify some trends or emerging issues in the industry. More information about the concept of 'Risk Culture: the missing link in Safety Culture?' and the link to access the questionnaire can be found @ www.riskculture.org.

Regarding the analysis of the data collected so far, the details will be presented in a separate report soon but a quick review of the responses to one of the questions clearly indicates that the 'brutal competition' (as described by one of the industry executives) and some of the external pressures such as consumer protection legislation continually put pressure on front line operators. The good news is that despite the respondents indicate their opinion strongly about the commercial pressure they constantly feel during daily operation, their responses to 'accepted risks' did not include many examples of 'excessive risk taking'. But equally the responses to 'rejected risks' also confirm that the expectations to accept considerable risks do exist in order to keep the flying schedule.

Why and how should you participate?

How risks can be mitigated and how commercial pressure can be managed is ultimately the key to maintain the remarkable safety performance the industry has achieved today. So my ultimate pitch to all professionals at the coalface and also the safety practitioners is three fold:

1. If you are involved in making operational or strategic organisational risk decisions, **YOUR EXPERIENCE MATTERS! PLEASE SHARE IT FOR OTHERS TO LEARN FROM YOUR EXPERIENCE AND RISK MITIGATION STRATEGIES!**
2. Please promote the study and the questionnaire (www.riskculture.org) so that we can collect more data in coming years. The real-life examples of 'Accepted & Rejected Risks' will verify the key challenges but also may enable us to identify emerging issues and threats, which may not be reported through existing channels.
3. If you wish to conduct a collaborative study, not only to collect data from the front line operators but also ask the same risk decisions to different levels in the management in your organisation, please do not hesitate to contact me. The differences in 'RISK APPETITE' in an organisation may enable to address some fundamental systemic issues, which may be the causal or contributory factor to a potential accident.



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