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CONSOLIDATED AVIATION SAFETY KNOWLEDGE MANAGEMENT: AN ENABLER OF IMPROVED OPERATIONAL SAFETY

(Presented by Lithuania on behalf of the European Union and its Member States[1] and the other Member States of the European Civil Aviation Conference[2] and by EUROCONTROL)

EXECUTIVE SUMMARY

Aircraft manufacturers predict that potentially, by 2030, there will be one commercial aviation accident every three months. In order to address this clearly unacceptable societal risk there is a need, complementary to the sharing of safety data, for a consolidated and industry-wide approach to safety knowledge management, building on the foundations of State Safety Programmes and operators' Safety Management Systems, and on the structure of new ICAO Annex 19. Such an approach would be dependent on but not restricted to safety data sharing, and would provide a more rounded explanation, rationale and context for the data to aid understanding of how best to improve operational safety.

Such an approach should be cost-neutral for the aviation industry, simply bringing together already existing elements. States and aviation service providers would benefit greatly from a wider dissemination of information of a good quality, helping them implement efficient and cost effective safety improvement activities. Implementation of a sound, global knowledge management approach would help meet these information needs and avoid duplication of work.

Action: The Assembly is invited to recommend to the ICAO Council that consideration be given, in particular and most immediately by the Safety Management Panel in its further work on Annex 19, to the promotion widely of a consolidated, industry-wide approach to safety knowledge management.

1. INTRODUCTION

1.1 Aircraft manufacturers predict that potentially, by 2030 there will be one commercial aviation accident every three months, based on the current accident rate and the expected recovery in air

[1] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

[2] Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Republic of Moldova, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, The former Yugoslav Republic of Macedonia, Turkey and Ukraine.

traffic growth. This is an unacceptable societal risk, which if realized, would undermine the sustainable economic viability of the aviation industry.

1.2 ICAO has been very successful in leading aviation safety by providing States with a solid framework of systems and approaches to safety enhancement, for example State safety programmes, eight critical elements of a State's safety oversight system and implementation of Safety management Systems. Moreover, new Annex 19 is set to give further impetus to a structured approach to safety management. However, to reduce the accident rate even further in the future, there is a need, complementary to the sharing of safety data sharing, for a fully consolidated industry-wide approach to safety knowledge management. Safety data and information, widely disseminated and of a good quality, are the 'lifeblood' of the systems mentioned above, and there is a need to use them to energise future operational safety improvements.

2. OBJECTIVE AND SCOPE

2.1 The aim of this paper is to champion the concept of consolidated aviation-wide safety knowledge management as a key enabler of future aviation safety improvement.

2.2 The paper describes the limitations in the current uses of aviation safety data as such an enabler and sets out the potential benefits of an aviation-wide safety knowledge management approach, together with the underlying principles and elements that would support such an approach.

3. CURRENT LIMITATIONS

3.1 Within the aviation safety management system framework, aviation service providers deliver operational safety improvements through the processes of hazard identification, risk assessment and mitigation. However, these processes currently rely on fragmented knowledge, often restricted to the individual aviation service provider or State, complemented by somewhat ad hoc global aviation safety knowledge management.

3.2 Current safety knowledge management is largely dependent on, but is not restricted to, safety data-sharing. Simply trying to improve the collection, storage and sharing of the "lifeblood" data is not enough to keep the industry safe in the longer term. There is a need to convert the facts and figures into real knowledge – safety intelligence – that provide an overall explanation, a context and a proactive, robust and systematic understanding of how exactly to improve operational flight safety.

4. BENEFITS

4.1 The essence of a globally consolidated aviation safety knowledge management approach is industry-wide learning and sharing of best practices. It is only through such an approach that the aviation community can collate and learn the lessons from the infrequent – in statistical terms – safety occurrences. The proposed approach would systematically bring together diverse elements in the aviation safety knowledge chain, providing a more cost effective and efficient way of undertaking safety improvement activities, whilst reducing duplication.

4.2 Moving from a mainly safety data-sharing oriented regime to a full aviation safety knowledge management concept is fully in line with emerging Annex 19 developments and in Europe is fully consistent with future EU aviation safety direction and policy.

5. SAFETY KNOWLEDGE MANAGEMENT AS A PRINCIPAL ENABLER OF IMPROVED OPERATIONAL SAFETY

5.1 The application of an approach of the kind described here to the process of operational safety improvement would ensure that States and aviation service providers could implement operational safety improvements more efficiently, and thus be better prepared to respond to the safety challenges of the future.

5.2 It is suggested that a safety knowledge management approach[3] should be built on the following principles and elements:

a) ***Comprehensiveness***. Complete coverage of best practices from all segments of aviation, different geographical regions, and varying operational environments;

b) ***Traceability***. The origin of the best practices, regulatory requirements, safety management practices and evidence of resilience and vulnerabilities must be traceable;

c) ***Accessibility, Quality and Credibility***. Universal access for aviation safety professionals is key. The safety knowledge itself must be credible and reliable;

d) ***Availability and ease of use***. The number of aviation safety knowledge elements is vast. An intelligent mechanism with a rapid search capability to locate the desired information is essential;

e) ***Flexibility***. The approach and the related process would need to be sufficiently flexible to allow for changes in structural elements; and

f) ***Efficiency and sustainability***. The approach must not impose any additional burden on the aviation community, and should make full use of existing processes and tools.

6. CONCLUSION

6.1 The Assembly is invited to recommend to the ICAO Council that consideration be given, in particular and most immediately by the Safety Management Panel in its further work on Annex 19, to the promotion widely of a consolidated, industry-wide approach to safety knowledge management.

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[3] The prototype of a tool underpinned by the principles presented at paragraph 5.2 here is the SKYbrary web-based platform, a partnership project of EUROCONTROL, ICAO, the Flight Safety Foundation, the UK Flight Safety Committee, the European Strategic Safety Initiative of EASA, the FAA-led Commercial Aviation Safety Team, the International Federation of Airworthiness, and the Safety Management Systems International Collaboration Group.