

**54th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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AGENDA ITEM 1: THEME TOPIC

*“The Challenge of Managing Outcome Focused and Risk Based
Regulations for Asia Pacific States”*

**USING SECTOR RISK PROFILING FOR MANAGING RISK
BASED REGULATION AND OVERSIGHT**

(Presented by Australia)

INFORMATION PAPER

SUMMARY

Civil aviation has a high degree of diversity in terms of aircraft activity, aircraft types and the infrastructure and services used to support aircraft activity. One way of addressing diversity is by creating sectors based on aircraft activity with sectors aligned with a specific regulation. By adopting a sector risk profiling approach a picture of risks within a sector at a particular point in time is developed through a collaborative process that engages sector participants. The greatest value of a sector risk profile is derived when participants read the risk statements, decide which ones apply to their organisation and then determine what they can do to minimize that risk. A risk profile provides information to inform the aviation authority where to target its resources in terms of rule-making and surveillance. Finally the risk profiling process is embedded in a sector participant’s SMS and provides the pathway for exchange of information. The small aeroplane transport sector risk profile is used to demonstrate application of the risk profiling process and the outputs it generates for rule making and surveillance as risk mitigation actions.

USING SECTOR RISK PROFILING TO TRANSITION TO PERFORMANCE BASED REGULATION AND OVERSIGHT

1. INTRODUCTION

1.1 The civil aviation system has a high degree of diversity in terms of aircraft activity, aircraft types, infrastructure and services used to support aircraft activity and skills required to operate and maintain aircraft. To address diversity in the system and also to obtain a better understanding of operational and strategic risks in the system, Australia decided to sectorise the system based on the homogeneity in aircraft activity. Aircraft activity can be classified into three main classes: passenger carrying; aerial work; and general aviation. Each class has four sectors e.g. air transport segment comprises of large aeroplane transport, small aeroplane transport, helicopter transport and passenger carrying balloons. The [sector wheel](#) outlines 12 aircraft activity sectors and 4 main support sectors. Each sector within a class is assigned a Part of the Civil Aviation Safety Regulations 1998 e.g. large aeroplanes (in excess of nine seats) are aligned with proposed new CASR Part 121. In order to identify safety-related trends and risk factors and monitor the safety performance of the aviation industry, the Civil Aviation Safety Authority decided to adopt a three- tiered approach to identify and assess risks in the aviation safety system commencing with operator, sector and industry/system as noted in the Australian [State Safety Programme](#). Sector risk profile management consists of the development of a safety risk picture at a point in time of well-defined sectors within the aviation industry and subsequent monitoring and review of the risk picture. The Industry risk profile consists of the safety risk picture of the Australian aviation industry.

1.2 As sector risk profiling draws on the collective safety performance data of entities within a sector, it provides the foundation to transition from compliance-based regulation to performance-based regulation or risk informed regulation. Despite providing a conceptual framework that could improve aviation safety performance it can also assist with the safety performance measurement process. The International Civil Aviation Organization (ICAO) has stated that National Aviation Authorities (NAAs) should transition to a Performance Based Regulation (PBR) to oversight the aviation system to improve aviation safety.

1.3 Sector risk profiling adopts a data-driven process for identifying the current and emerging risks. The process output is a collection of risks that is the aggregate of known and predicted risks impacting the sector's operations as a consequence of factors within the operating environment, supporting infrastructure/services used and deviations associated with the growth and change in the sector.

1.4 Risk profiling outputs supplement CASA's oversight and decision-making through proactive risk identification and risk management processes to ensure the sector risks are maintained within acceptable limits. It is not practical to remove all risks as there are inherent risks which are a given for the sector operations being considered. Some risk may actually present positive opportunities to improve some aspects of the operation and recognising any such opportunity should be part of considering what action to take should a particular risk occur.

1.5 Risk profiling identifies risk treatments for risks that are outside "As Low as Reasonably Practicable" and these risk treatments range from reforming existing rules, introducing new rules and other non-mandatory initiatives in the area of safety promotion and safety education. Effective risk management is a means of monitoring the deviations from the objectives due to changes in the operating environment that present with both risks and opportunities. The process of risk management focuses on controlling the risks while maximising the opportunities.

1.6 Sector risk profiles can be used by sector participants and the national aviation authority in several ways. The greatest value of a sector risk profile is derived when participants, including the aviation authority, read the statements, decide which ones apply to their organization and then determine what they can do to minimize that risk. By addressing individual elements of risk within a sector, the overall accident rate and costs to the sector can be reduced. Sector risk profiles also help to inform the Aviation Authority where to target its activity and resources.

1.7 Sector risk profiling is conducted in two phases. Figure 1 is the process map for Sector Risk Profiling and shows the linear flow of the process. It comprises of two phases with each phase involving a number of sub-processes that align with the risk management process referred to in ISO 31000:2009. Although the sub-processes are outlined as separate elements with defined interfaces, in practice they will overlap and interact.

1.8 Communication and consultation is initiated at the beginning of risk profiling and flows through the various stages while monitoring and reviewing is a continual improvement mechanism that commences at the end of the process and feeds into the future risk profiling of the sector. Within the Sector Risk Profiling process, risk assessment extends over both the phases and includes risk identification, analysis and evaluation and is defined separately in the following section.

1.9 There are three deliverables associated with the risk profiling process: sector risk profile report, which is circulated internally and to any stakeholders participating in the consultation process in the second phase; State of Sector Report and sector risk profile publication and risk register, which is circulated internally as well as externally and is published on the CASA website.

1.10 CASA's profiling process commenced towards the end of 2015 and the first profile for aerial application was completed in the first half of 2016. The profile was developed through the application of the CASA sector risk profiling methodology and followed a basic process of defining the sector based on its activity. CASA has developed risk profiles aerial mustering, aerodromes, small aeroplanes (upto 9 passenger seats), large aeroplanes (more than 97 seats). Other profiles nearing completion include helicopter medical transport, aeroplane medical transport and commercial hot air balloons. [SRPs published].

1.11 As risk assessment has become the tool of choice for a variety of functions, including framing of risk informed regulation and of prioritizing surveillance to identify gaps in conformance to AOC requirements, CASA decided to develop a [risk profile for the small aeroplane transport sector](#) to understand the diversity in the sector and the underlying influences on safety.

2. DISCUSSION

2.1 The small aeroplane transport sector is essential to the social, economic and cultural sustainability of Australia's remote and regional communities. The sector operates scheduled and non-scheduled services to transport passengers and freight using small aeroplanes with a seating capacity of up to 9 passenger seats. According to the Regional Aviation Association of Australia (RAAA), over 4 million Australians rely on regional air services across the country. Regional industries such as tourism, mining and manufacturing, which have a significant impact on employment prospects and resilience of rural, regional and remote communities, are also dependent on reliable air services.

2.2 The strengths of the sector, which include low initial cost and good internal communication, have been outweighed by a number of weaknesses which provide challenges for operators and regulators. These weaknesses include smaller companies (37% of authorisation holders only have 1 to 5 total staff), ageing aircraft (average fleet age being 31 years old) and shortage of pilots. Principal threats facing the sector as identified by sector participants include difficulty in obtaining spare parts, maintaining a spare aircraft, increasing regulatory burden, increasing costs of air navigation services, fuel, wages, information technology systems and insurance.

2.3 The small aircraft operating on regional networks are becoming significantly more expensive to maintain as airframes age, there are difficulties in obtaining Original Equipment Manufacturer (OEM) or OEM equivalent components, there is a shortage of licensed personnel including engineers and specialists such as welders, and there is a diminishing pool of suppliers as owners of organisations age without succession plans in place and are unsure to commit to the progression of a maintenance organisation that is compliant with Civil Aviation Safety Regulation (CASR) Part 145. Industry has indicated that some organisations have felt that the selective roll out of Part 145 certification has created an uneven playing field resulting in a major cost imposition for those taking up Part 145. Adding to the regulatory burden are aerodrome costs which include rents and landing charges.

2.4 The provision of scheduled and non-scheduled services offered by the sector has resulted in differing legislative mandates governing technical and operational requirements for provision of air services, with the scheduled category requiring a training and checking system for pilots and the application of a safety management system, and Part 145 maintenance organisation. However, the substantially higher accident rate for nonscheduled services which is eleven times that for scheduled services, suggests the safety benefit of these additional risk mitigation measures.

2.5 A set of objectives were identified by sector participants for the sector and used as part of the preliminary risk assessment process to evaluate the threats from each risk to achieving the objectives:

- Maintain safe and efficient operation of aircraft for commercial air transportation.
- Encourage and promote the use of people who are trained and competent in the safe operation and regular maintenance of aircraft and associated equipment.
- Promote the identification and reporting of hazards, and analysis of incidents.
- Improve the efficiency, responsiveness and objectivity of the regulatory system in a cost effective manner.
- Encourage the development and implementation of a safety culture.
- Sector engagement through risk management systems that are respected and relevant.
- Establish a collaborative and cooperative relationship between sector participants and CASA

2.6 The sector was defined as “*Group of individuals and organisations holding permissions to use fixed wing aircraft (MTOW ≤ 8,618kg) for hire or reward to fly from a location to another location with up to 9 passengers and/ or carrying freight cargo*”.

2.7 The profiling process had a strong spine of consultation and peer review and was supported by CASA and industry risk teams reviewing a variety of data sets and surveys and applying quantitative and qualitative analytical tools to develop a list of hazards and associated risks. The risks associated with the identified hazards were validated in a workshop. Through planned regular consultations between CASA staff and sector participants a sector risk register was completed in a second workshop and a series of mini workshops were held across regional offices using video communication facilities to validate the risk register.

2.8 To develop the risk register, the risk assessment process adopted the likelihood-consequence-exposure matrix and used the most credible impact/consequence and a set of associated risk controls. Risk treatments were identified for risks assessed as outside as-low-as-reasonably-practicable (ALARP) or the tolerable region.

2.9 Risk treatments that could be adopted as risk-based regulations included:

- Transition from a Schedule 5 - CASA Maintenance Schedule to Schedule 6 - CASA System of Certification of completion of maintenance or Part 145
- Fitment of terrain awareness warning system (TAWS-B)
- Training and checking system
- Safety management system
- HF Assessment in commercial pilot licence flight test requirements

2.10 Risk treatments identified to improve oversight included:

- Improvements to the CASA surveillance framework
- Internal training for CASA inspectors
- Improve industry understanding of CASA surveillance principles
- Consideration of 3rd party audits and lessons learned from 3rd party audits

2.11 In summary, the development of a sector risk profile is based on:

- Data fusion for building relationships, patterns and transformations with data
- Team from functional areas within the aviation authority
- Workshops with sector participants to develop a sector risk register with safety initiatives if required
- Monitoring sector safety performance with safety performance indicators
- Safety performance information exchange with sector participants to update the profile.

2.12 The development of safety performance indicators for the sector has not yet been completed and is likely to be completed in the first half of 2018. Safety performance information exchange is pending till the completion of a taxonomy which sector participants can adopt for providing an accurate description of incidents that are reported into their safety management systems.

2.13 The implementation of the risk profile will be carried out in three stages:

- Assurance mapping of the sector risk register with a sector participant's risk register in terms of risks identified, risk controls and risk mitigators in place
- Assurance mapping of the CASA surveillance scope and criteria to seek assurance that the surveillance program is targeting the risks in the sector and evaluating the effectiveness of risk controls and risk mitigators in addressing risks
- Implementation of risk treatments by treatment owners

2.14 When the risk register is fully implemented, any additional risk treatments identified become controls and thus reduce the risk level of the sector. The responsibility for implementation of the treatment measures for which industry has accountability rests with authorisation holders, operators and pilots.

2.15 As shown in Figure 2, once the profile is implemented by adopting the measures described earlier, sector risk profiling becomes fully embedded in a sector participant's safety management system and thus informs amendments or additions to rule-making, additional safety promotion initiatives and the effectiveness of the regulator's oversight program.

2.16 The way forward in the 'SRP space' is to 'collaborate more' and 'engage more' with all stakeholders to increase understanding, promote safety improvement opportunities, and work on solutions together. This is underpinned by creating a culture that encourages open and honest communication listening to others, showing respect and maintaining trust.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note this paper.

Figure 1: Sector risk profiling process

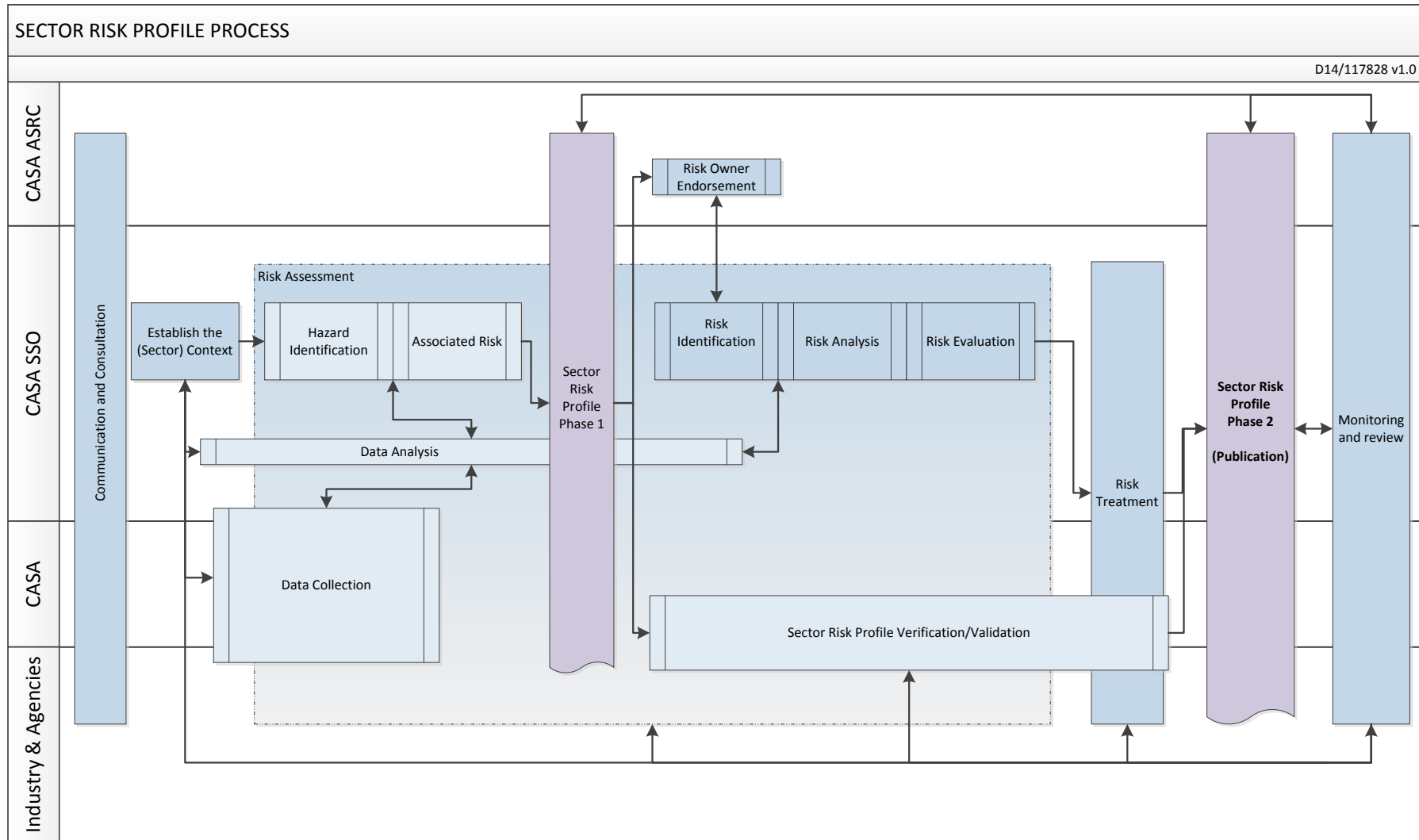


Figure 2: Sector risk profiling is embedded in a safety management system

