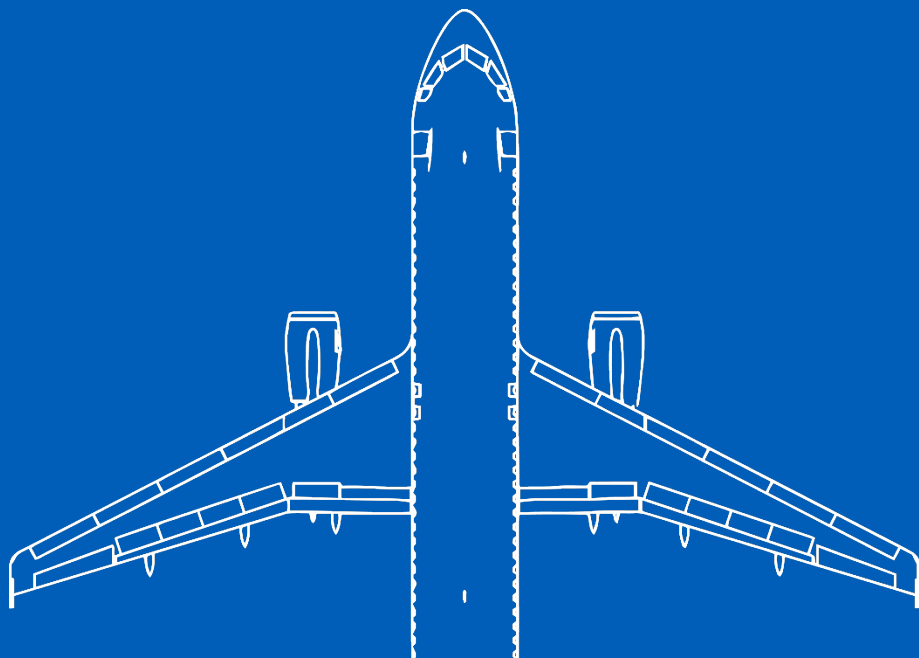


“Making safe aviation even safer”

Civil Aviation Authority Sector Risk Profile of Medium and Large Aircraft Air Transport

Final Report

Updated May 2019



SECTOR RISK PROFILE

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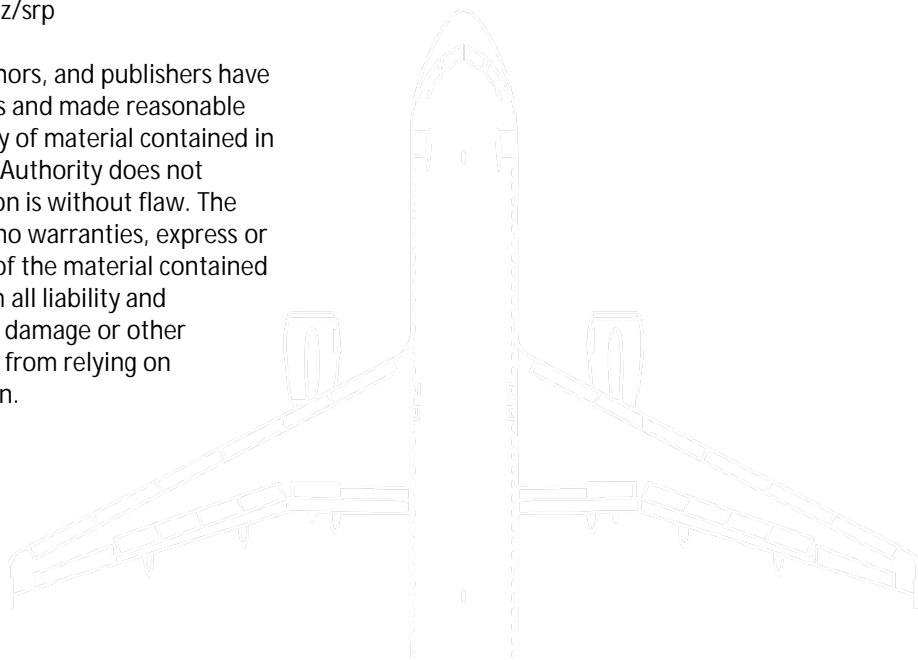
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HOW TO READ AND USE THIS SECTOR RISK PROFILE

Thank you to all who have been involved in developing this Sector Risk Profile.

The Medium and Large Aircraft Air Transport (Parts 121, 125, 129, & ANZA) Sector Risk Profile was developed in 2017. The 2019 update focuses on the Sector's progress in implementing actions to improve safety. These actions are outlined in Part 5 of this report and their progress is detailed in Appendix III.

To get the most out of this report, we suggest that you:

1. Start by reading Parts 1 - 3 to understand the context of this profile, and how it was developed.
2. Compare the risks identified in Part 4 to your organisational risk profile. You may wish to run this as a group discussion exercise and identify which risks are applicable to your organisation.
3. Review the controls and actions summarised in Part 5 that correspond to the risks you have deemed relevant to your organisation. Decide how best to incorporate these in to your safety management system and/or risk management processes.

Some points to note as you read:

In some instances, the actions identified to mitigate key risks address multiple risks and causes, and therefore have been repeated. This is purposeful, and is designed to support sector participants and the CAA in managing risks relevant to their operations.

This profile is not intended to identify all risks, controls and actions. It is a snapshot of what the sector thinks is most important at this time. You may / will have other risks and actions that are just as important to your organisation at the moment. Please ensure you still focus on these.

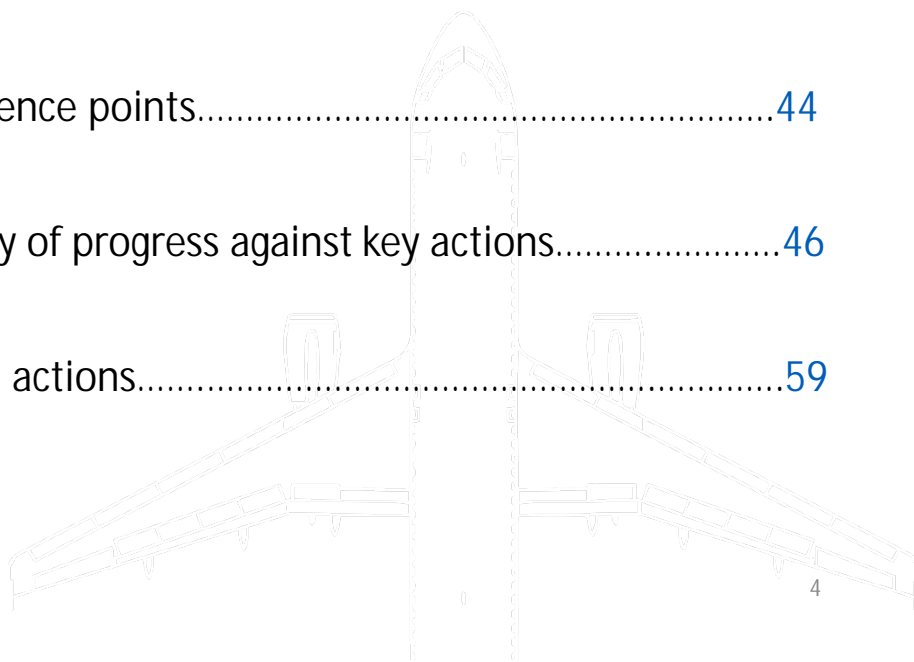
What happens now?

- **Get the message out** that your operation or organisation can now use the SRP and associated documents to improve your organisation's safety performance. Use it to inform your identification and management of safety risk.
- **Share information** with your colleagues, local operators, and the CAA to ensure all in the sector learn from others' experiences in terms of emerging and changing risks.
- **Share controls** – although we operate in a competitive environment, no one has a monopoly on safety within the sector. Share controls with your colleagues, local operators, industry organisations, and the CAA. Consider establishing a safety page on your own website where others in the sector may benefit, and share with the CAA to enable promulgation on the CAA website where participants can share controls.
- **Share your progress** in terms of the status of 'actions' implementation, and the enablers and barriers to improving safety within your own organisation. Your local user groups, industry organisations, and CAA is interested in your progress and developments in your safety journey.
- **CAA will use the SRP to target its resources to aviation system safety risks.** We have collaboratively worked on this SRP together as a sector, and we all have an interest in ensuring we are using our resources appropriately. CAA has made a commitment to ensure we use our resources to make a positive contribution to safety, especially in the areas where we have collaboratively agreed that specific actions will benefit all stakeholders.

Mark Hughes
Deputy Director Air Transport and Airworthiness

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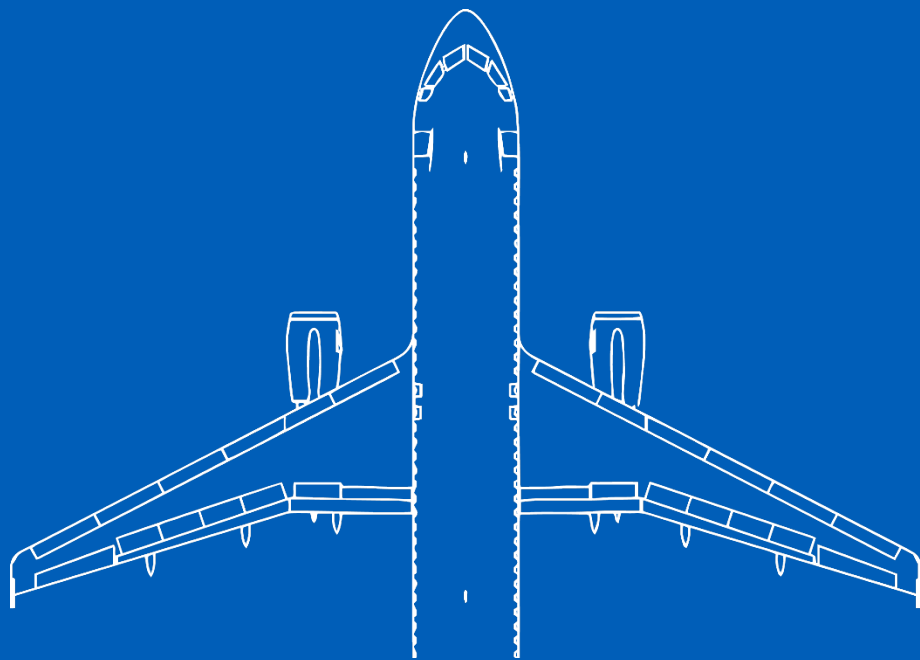
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Part 1

Sector Risk Profile

Overview



PART 1: SECTOR RISK PROFILE OVERVIEW

1.1 Performance Based Regulation

National Aviation Authorities (NAAs) are introducing a new approach to overseeing and improving aviation safety known as Performance Based Regulation (PBR). PBR is changing the way an NAA carries out its oversight, and how it collects, analyses and uses safety risk information. The idea that regulators should gather more and better information about safety risks and use it to prioritise activity is well established.

The five objectives of the PBR approach are to:

- I. Gather and analyse safety risk information about all parts of an organisation's operation in a joined up way – the entity approach.
- II. Agree on actions needed to improve safety and uphold standards with each entity's 'Accountable Manager'.
- III. Create a better understanding of the top risks facing major aviation sectors and the performance of Industry to manage them.
- IV. Make informed decisions about which safety outcomes the Regulator & Industry should focus on and steps to achieve them.
- V. Allocate regulatory resources proportionately to the areas of activity with greatest potential to enhance aviation safety.

1.2 What is a Sector Risk Profile?

Aviation contains elements of risk by the very nature of the speeds and forces involved. Safety in aviation requires an understanding of the risks and deliberate actions to reduce their probability of occurrence.

The CAA monitors safety performance in line with worldwide practice by recording the number of accidents, and expressing those as a rate of accidents per flying hour. To account for inherent differences, the aviation industry is divided into 13 sectors. Even so, the accidents within a sector have many different causes, which are not always apparent when expressed as an aggregated accident rate.

A Sector Risk Profile (SRP) is a way of examining the various underlying influences on safety within a given sector. By breaking the overall risk into specific risk statements, attention can be focused on specific problems. For example, 'reducing landing accidents' is more easily addressed than, simply 'reducing accidents'.

An important aspect of sector risk profiling is understanding that the participants within a sector are well placed to evaluate the risks they face. Accordingly the sector risk profiling method is based around capturing the knowledge, experience, and perceptions, of as many participants as possible from within the sector. The resulting mix of fact and opinion is combined with evidential data, such as industry studies and demographics, and expressed as set of risk statements that describe the risk.

The resulting set of risk statements can be expressed as a profile that will vary from one industry sector to the next. A hazard may create a significant risk in one sector, but not another. For example, wires are a risk to agricultural operations but less so to airline operations. The identification of risks as they occur in the sector of interest is what makes it a sector risk profile.

1.3 How are Sector Risk Profiles used

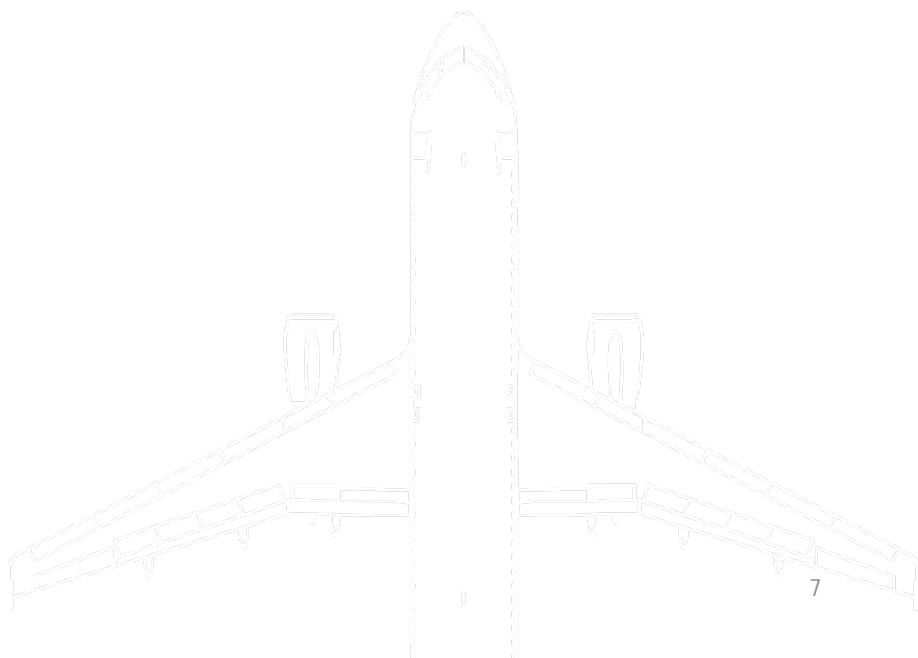
The purpose of sector risk profiling is to support aviation participants to manage their risks, thereby reducing overall accident and incident rates and costs to the aviation sector. This will also help to provide public assurance around the safety of the aviation system and impact positively on the overall trust in New Zealand's aviation safety. An effective SRP will also inform the CAA about where it should focus its regulatory activity and inform operators about where they should focus their Safety Management System (SMS) response and resources.

A SRP also highlights that some areas of risk are beyond the effective influence of CAA. Some operational practices may carry risks that are highly dependent upon the actions of individual participants, organisations, or industry groups. Therefore, the greatest value of a SRP is derived when participants read the statements, decide which ones apply to their organisation and then determine what they can do to minimise that risk.

1.4 What should Sector Risk Profiling achieve?

The sector risk profile aims to:

- Identify emerging strategic and operational risks that are likely to affect the sectors, recognising that risks are managed by the sector participants and regulated by the CAA
- Drive continuous improvement of safety benefits within sectors
- Reduce uncertainty associated with safety and business performance and give the CAA and the sector greater freedom to plan and use resources for innovation and measured risk management.



1.5 How does the SRP relate to Safety Management Systems?

The SRP looks at high level risks that may affect multiple stakeholders, including emerging risks. The risk statements and treatments for the sector can be used by operational stakeholders to inform their operation-specific SMS plans. By addressing individual elements of risk within a sector, the overall accident rate and costs to the sector can be reduced. CAA can then target their interventions based on the effective implementation of risk responses within an organisation's SMS.

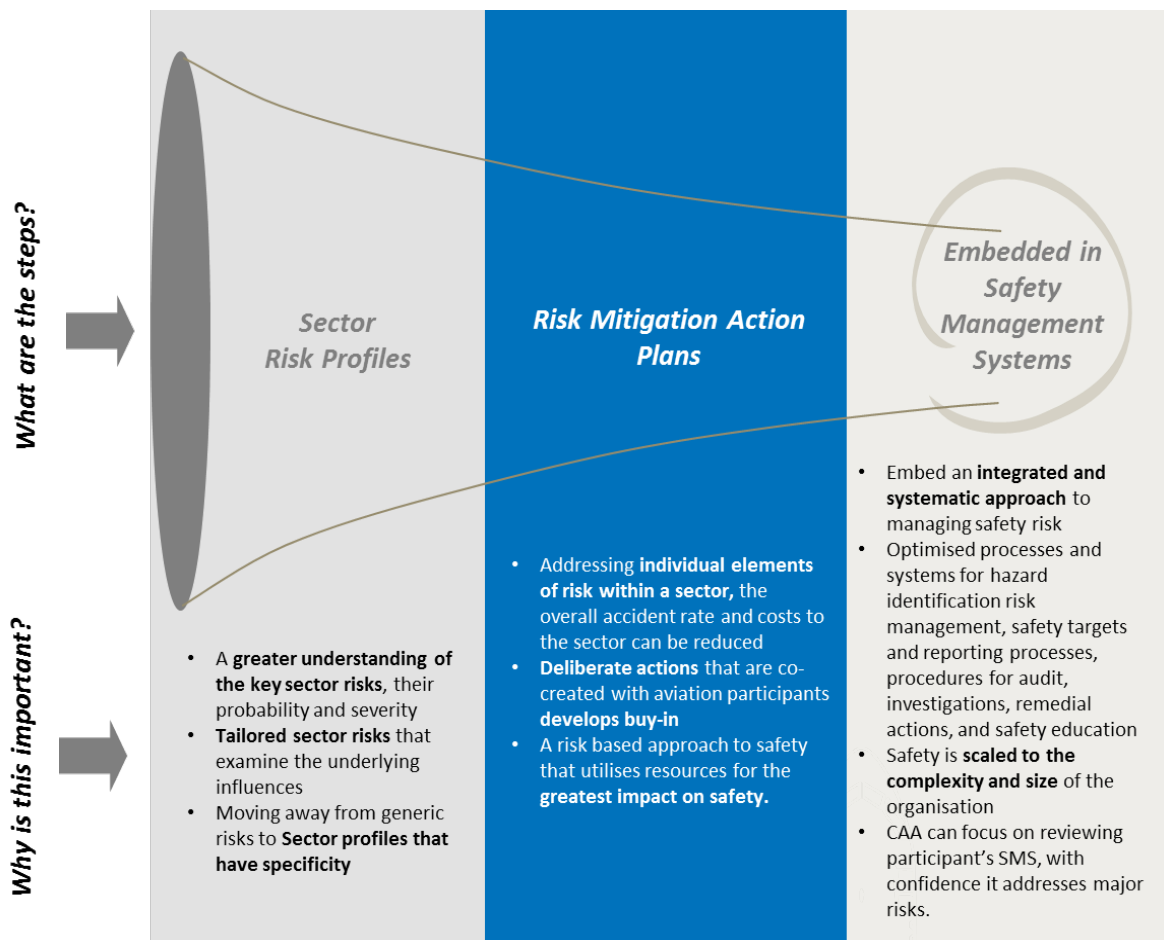
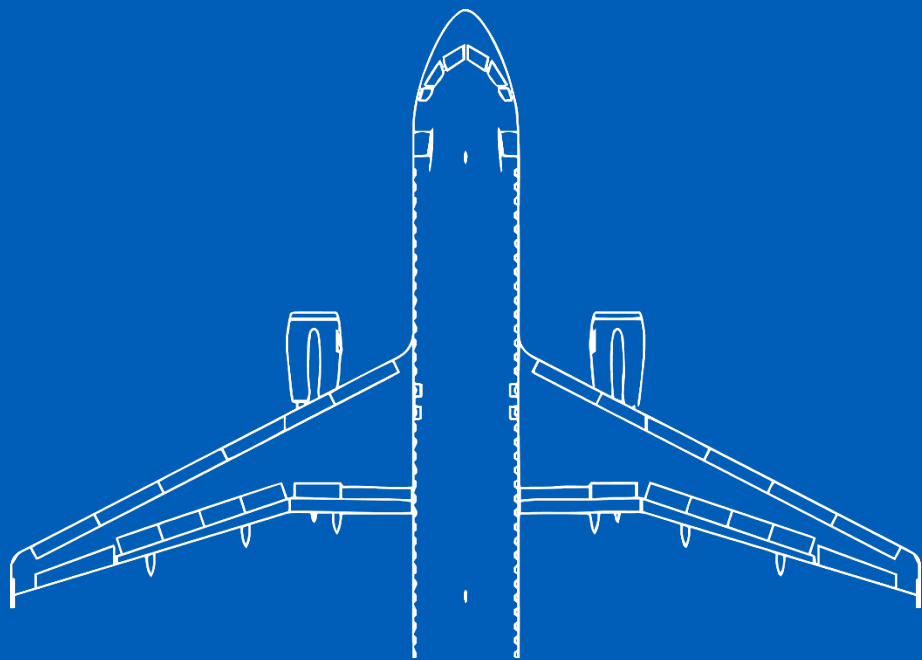


Diagram 1: How sector risk profiles relate to safety management systems.

Part 2

Focus of this Sector Risk Profile



PART 2: FOCUS OF THIS SECTOR RISK PROFILE

2.1 What we aimed to achieve with this SRP

Previous SRP work in New Zealand and abroad, has focused predominantly on identifying the key risks, causes, and controls that are in place within a sector. While this is an important part of developing an SRP, more important is identifying key actions that the aviation sector can take to reduce, or better manage, key risks. For this reason, we consciously decided to focus on delivering positive action from this SRP process. While this may mean that this document does not provide a comprehensive analysis of each risk and related controls, we intend that it will lead to the sector responding with detailed actions to mitigate the identified risks. We also understand that responsibility for some actions will lie outside of the Medium and Large Aircraft Air Transport sector, and this will be addressed through future SRP work.

2.2 Overview of the Medium and Large Aircraft Air Transport Sector

The focus of this SRP is the Medium and Large Aircraft Air Transport participants. The sector includes Air Operator Certificate holders under Part 119 of the Civil Aviation Rules ("CAR"), and in particular Part 121 (Large Aeroplanes), Part 125 (Medium Aeroplanes), Part 129 (Foreign Air Transport Operator), and ANZA regulations (recognition in NZ of aircraft certified by CASA).

2.2.1 NUMBER OF ORGANISATIONS

There are a total of 70 organisations who operate large and medium aircraft in an air transport capacity under the rule parts mentioned above. Table 1 shows the number of organisations operating under each rule part. Some organisations have aircraft that require them to operate under multiple rule parts.

Authorised operations	Number of certified operators
CAR Part 129 to and from NZ	50
CAR Part 125 Domestic	8
ANZA (Australia operating in NZ)	5
CAR Part 121 Domestic	2
CAR Part 121 Domestic and International	2
CAR Part 125 Domestic and International	2
CAR Part 121 and Part 125 Domestic and International	1
Total	70

Table 1: The number of operators authorised to operate large and/or medium aircraft air transport in, and/or to and from, New Zealand as at 30 April 2019

2.2.2 NUMBER OF AIRCRAFT

The number of large and medium aircraft registered in NZ has increased over the period 2009 to 2018. The table below summarises the number of aircraft by category, but does not include the fleets of operators in the Part 129 or ANZA authorized operations.

Aircraft category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Large aircraft	118	119	127	125	128	128	125	136	134	136
Medium aircraft	84	78	78	80	79	78	77	69	74	76
Total	202	197	205	205	207	206	202	205	208	212

Table 2: The number of aircraft by category in NZ 2009 to 2018

2.2.3 SEAT HOURS

Table 3 shows the number of seat hours, in thousands of hours, for large and medium airline operations from 2009 to 2018 (the safety outcome target group is a combination of the aircraft type and operation). Seat hours are determined by the CAA, based on aircraft seat configuration, number of flights, and a capacity factor. These numbers do not include the hours of operators in the Part 129 or ANZA authorised operations.

Safety outcome target group	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Large aircraft	46,288	46,811	48,304	48,760	49,695	49,173	46,539	50,640	51,443	49,794
Medium aircraft	703	672	712	702	668	508	472	367	333	361
Total	46,991	47,483	49,016	49,462	50,363	49,681	47,011	51,007	51,776	50,155

Table 3: The seat hours for aircraft by safety outcome target group from 2009 to 2018 (thousands of hours)

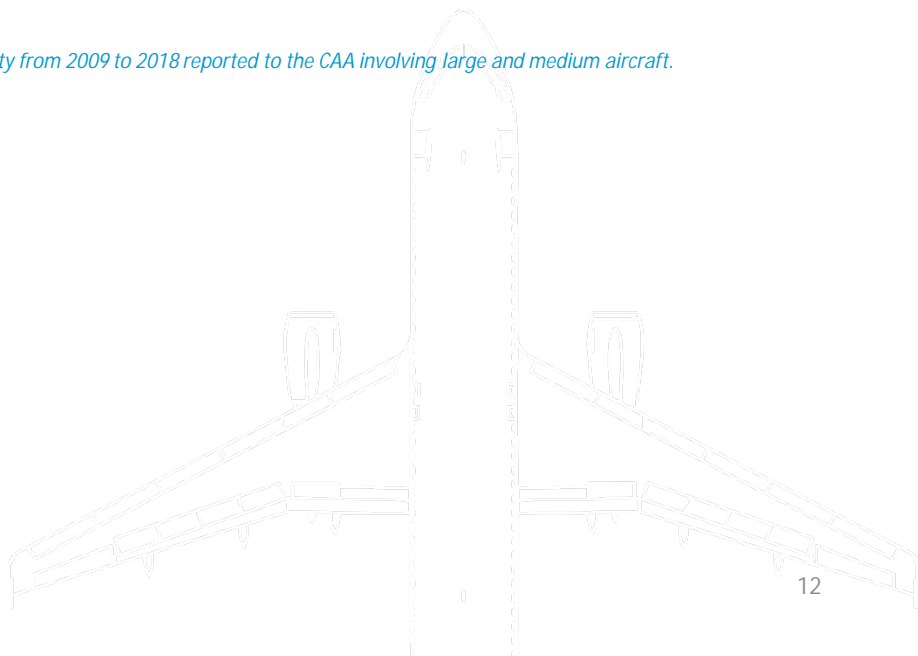
2.2.4 AIRCRAFT ACCIDENTS

Occurrences are required to be reported to the CAA under Part 12 of the Civil Aviation Rules. Occurrences are accidents or incidents involving aviation and generally fall under 11 different occurrence types.

Table 4 shows the number of accidents involving large and medium aircraft reported to the CAA each year since 2009. These include all those large and medium aircraft operations, not just air transport.

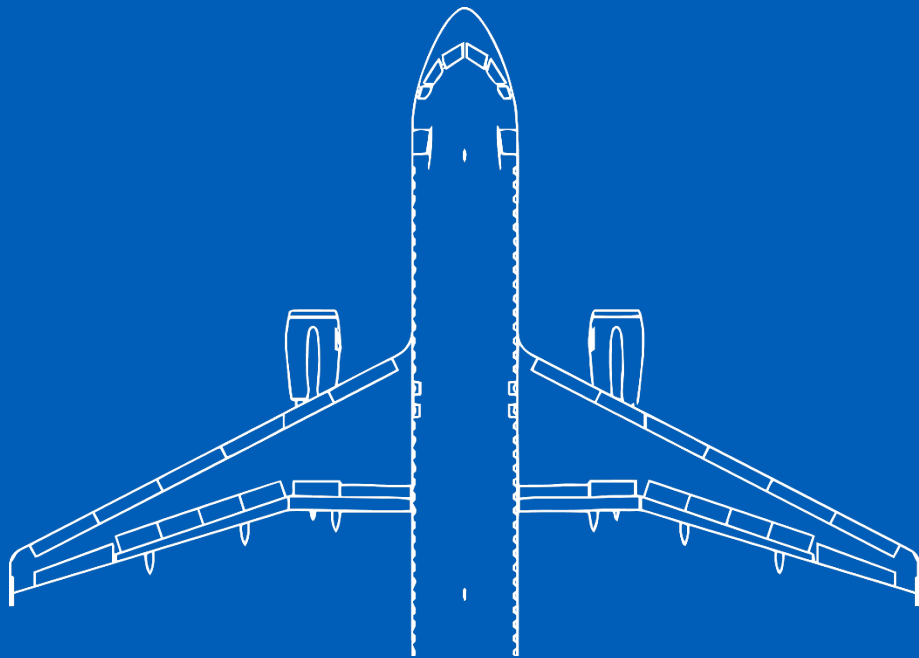
Critical accidents	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Large aircraft	0	0	0	0	1	0	0	0	0	0
Medium aircraft	1	0	0	0	0	0	0	0	0	0
Major accidents	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Large aircraft	0	1	1	0	1	1	0	2	0	0
Medium aircraft	0	0	1	0	0	0	1	0	0	0
Minor accidents	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Large aircraft	4	1	0	0	0	2	0	0	1	0
Medium aircraft	0	1	0	0	0	0	0	0	0	0

Table 4: The number of accidents by severity from 2009 to 2018 reported to the CAA involving large and medium aircraft.



Part 3

Sector Risk Profile Methodology



PART 3: SECTOR RISK PROFILE METHODOLOGY

Developing an SRP requires a mixture of art and science. The focus of this SRP was to identify the aviation sector's view of significant risks and the areas they want to focus on to drive positive action. With this in mind we followed a methodology that sought to incorporate objective data with participant experience and specialist knowledge. In summary, the SRP methodology utilised the risk management process defined in *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*.

This risk management standard provides organisations with guiding principles, a generic framework, and a process for managing risk. This interim report outlines the process that has been followed to date, and how these link to the high level elements of AS/NZS ISO 31000:2009. It should be noted that the process followed in developing this SRP sought to rely on participant experience and expertise, and New Zealand data, rather than attempting to align to a specific philosophy such as Reason's Accident Causation Model.

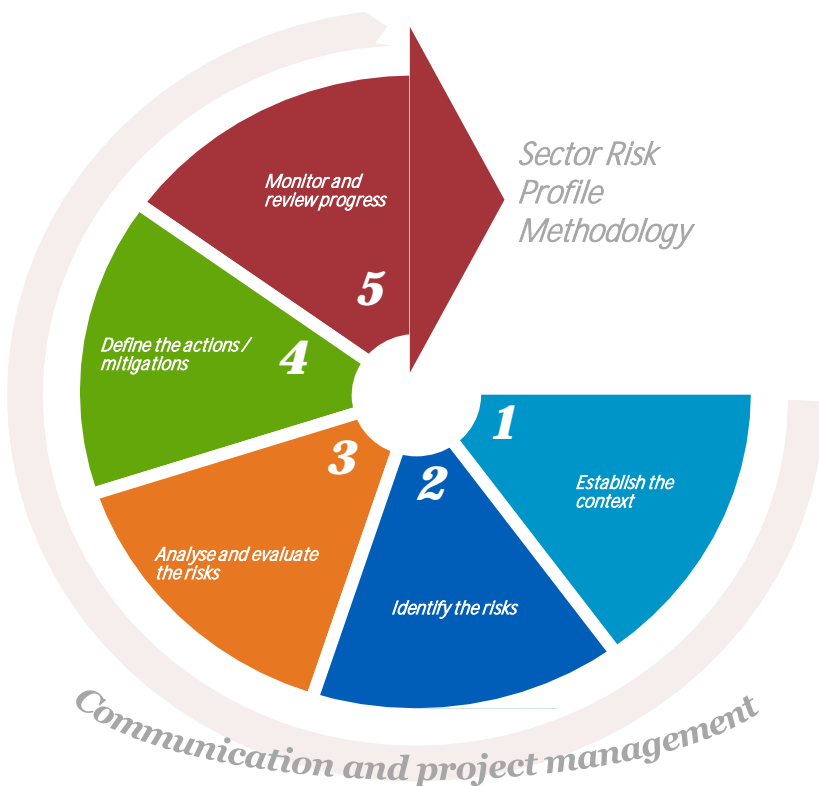


Diagram 2: SRP methodology



Progress to date – September 2017



3.1 Establish the context

The scope of this SRP was limited to the Medium and Large Aircraft Air Transport participants (specifically those holding 121, 125, 129 certificates or ANZA authorised operators). The ultimate purpose of this SRP was to:

- I. seek agreement with participants on the key risk areas relevant to this sector; and
- II. Identify a manageable number of actions that the sector can commit to addressing to minimise or mitigate the identified risks.



3.2 Identify the risk areas

To identify an initial list of key risk areas we performed three key steps:

a. *Surveyed participants*

A survey of large and medium aircraft air transport sector (including operators (domestic, foreign, and ANZA), air traffic services, and aerodromes operators) was sent out in late December 2016. The survey was voluntary and anonymous. The purpose of the survey was to establish a base understanding of the risks to large and medium aircraft air transport in the NZ aviation environment, under a number of core categories. In total, 38 responses were received from 90 invitations, a response rate of 42 percent. The content from this survey contributed to the development of a sector workshop held in March 2017.

b. *Reviewed SRPs from UK and Australia*

To provide a starting point for discussion, we identified a list of approximately 20 key risk areas from two countries that have already completed an exercise to identify key risks to the Medium and Large Aircraft Air Transport sector.

c. *Workshop #1 - Risk identification*

In March 2017 we ran an open invitation workshop with 60 participants from across the sector. This included international participants from Malaysia, China, Singapore, Australia and the USA. This workshop built on data from the survey and international information already analysed, and identified a total of 26 risk themes for further analysis. A high level derivative of the *Bowtie Risk Methodology* was utilised to guide the discussions. Participants were encouraged to focus on those areas most relevant to the New Zealand operating environment.

Workshop 1 – March 2017



Progress to date – September 2017



3.3 Analyse and evaluate the risks

The first workshop identified an initial list of 26 risk themes (these are attached as appendix I), and related causes and consequences. While the workshop incorporated peer review and challenge of the risk themes and causes, further analysis was required to ensure consistency across the definitions, level of detail and relevance to the New Zealand operating environment. The SRP project team performed the following process to analyse and evaluate the risks:

a. *Initial evaluation*

At the conclusion of Workshop 1 we reviewed the wording of all 26 risk themes and causes that had been identified. This initial evaluation identified some risk themes that were:

- better defined as causes (e.g. bird strike)
- able to be amalgamated under one risk theme (e.g. a number fitted within "Aircraft Upset")
- better addressed as overarching causes contributing to the other 11 risk themes (e.g. Regulator agility) but still warranting focus within this SRP exercise.

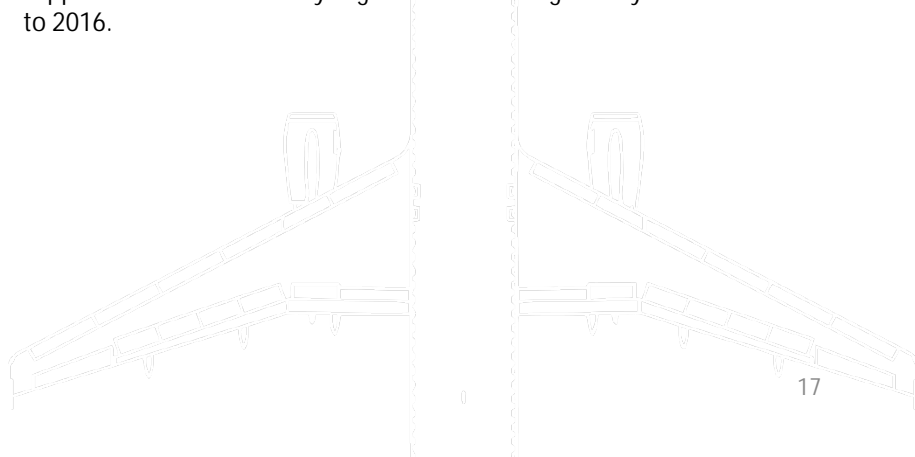
This initial evaluation identified a list of 11 key risk themes for further analysis, and three overarching causes (e.g. Regulator agility).

b. *International scan*

Once the 11 key risks themes were identified, we then compared the area, wording and definition with ICAO, UK and Australian data to correlate our analysis with overseas information, and ensure the definitions were relevant to the New Zealand operating environment.

c. *Data analysis*

CAA's Intelligence, Safety and Risk Analysis team performed a detailed analysis of all safety data within CAA's data stores for the past six years to test the risk themes identified and the causes. Due to the inherent limitations of the data (e.g. definitions and completeness) we were unable to provide 100% comfort over every cause identified. However, the analysis supported the risk themes and causes identified, and did not highlight any other areas that were obviously missing or had been identified without due support. This included analysing incidents investigated by the CAA from 2010 to 2016.



Progress to date – September 2017



3.3 Analyse and evaluate the risks

d. *Feedback from participants through issuing interim report*

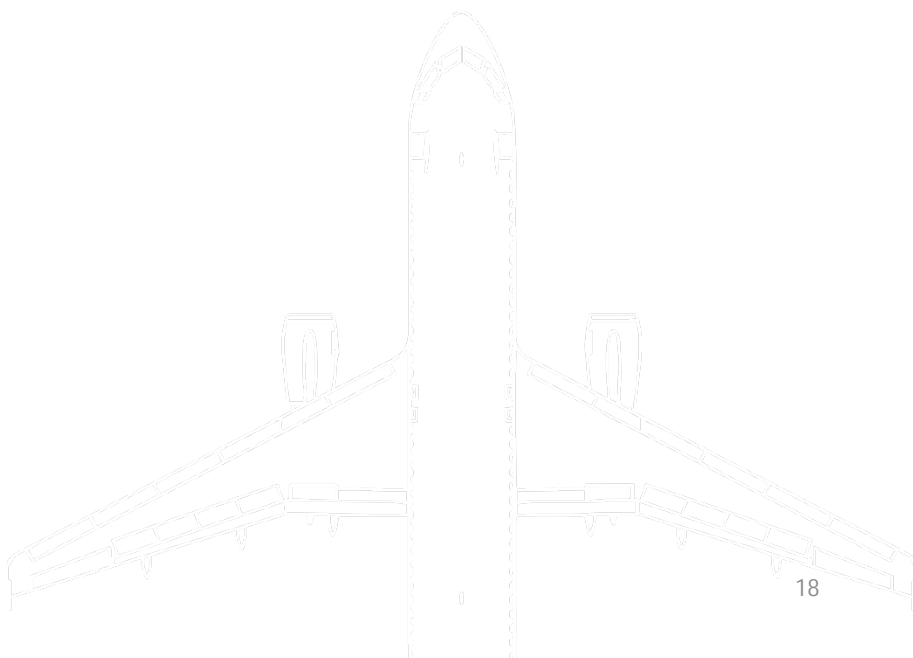
The SRP project team provided an interim report to workshop participants to seek their feedback on the draft risk themes that had been identified during the first workshop.

This interim report acknowledged that some of the risk themes identified could also have been articulated as causes (e.g. Damage to the aircraft while on the ground). However, we decided to leave these as risk themes to highlight that they are key focus areas relevant to the New Zealand environment, and to reflect the feedback received from the workshop participants.

e. *Surveyed participants to identify key causes*

In addition to the 11 risk themes, the first workshop also identified a significant number of potential causes that may give rise to those risk themes. To enable us to focus the efforts of the second workshop, the SRP project team sent a survey to all participants, asking them to select the three principal causes they considered should be targeted in order to most effectively reduce the risk to safe operations. Participants were also asked to note any other causes that had not been identified to date.

We intend that this SRP will be a living project that continues to evolve over time. As such, the SRP project team has considered that the list of 11 risk themes and three overarching causes are a useful place to focus sector efforts at this stage.



Progress to date – September 2017



3.4 Define the actions / mitigations

a. *Workshop #2 – Action identification*

In May 2017 we ran a second workshop, with around 55 participants from across the sector. The purpose of this workshop was to identify key actions for the sector to take, building on the risks and principal causes identified in Workshop # 1.

For each principal cause (identified by the sector previously) workshop participants were asked to identify at least three key controls that were either in place or should be implemented to address the principal causes. Participants were then asked to identify key actions that could be taken to strengthen existing controls, or implement new controls.

This exercise generated an initial list of 115 controls and 189 potential actions that the sector could undertake to strengthen the control environment (refer to <http://www.caa.govt.nz/safety-info/safety-reports/sector-risk-profiles/> for the complete list).

b. *Expert internal panel analysed the actions*

The controls and actions identified in Workshop # 2 will be useful for individual participants to consider in their operations. However, the SRP project team also wanted to produce a more refined action list that would provide the sector with a manageable starting point from which meaningful action could occur in the short to medium term.

To produce the refined action list, CAA formed an internal panel with subject matter experts to review and refine the risks, causes, controls, and proposed actions. This process resulted in identifying 35 actions across the 11 risk themes, and included activity across all sector participants. Participants were invited to provide final feedback on these actions in July and August 2017, and this resulted in a final list of 31 actions for the sector to initially focus on (See Part 5).

While the 31 actions will form the key focus for the sector in the short to medium term, we also encourage participants to review the extended list 189 potential actions to identify any that may be appropriate for individual participants to already implement .

Progress to date – September 2017



3.4 Define the actions / mitigations (Cont.)

c. *Development of implementation plans*

The 31 actions were not designed to be overly detailed, but to provide sufficient guidance for participants to understand how they may apply to their organisation. It is expected that greater detail will be developed as accountable parties begin to implement the actions.

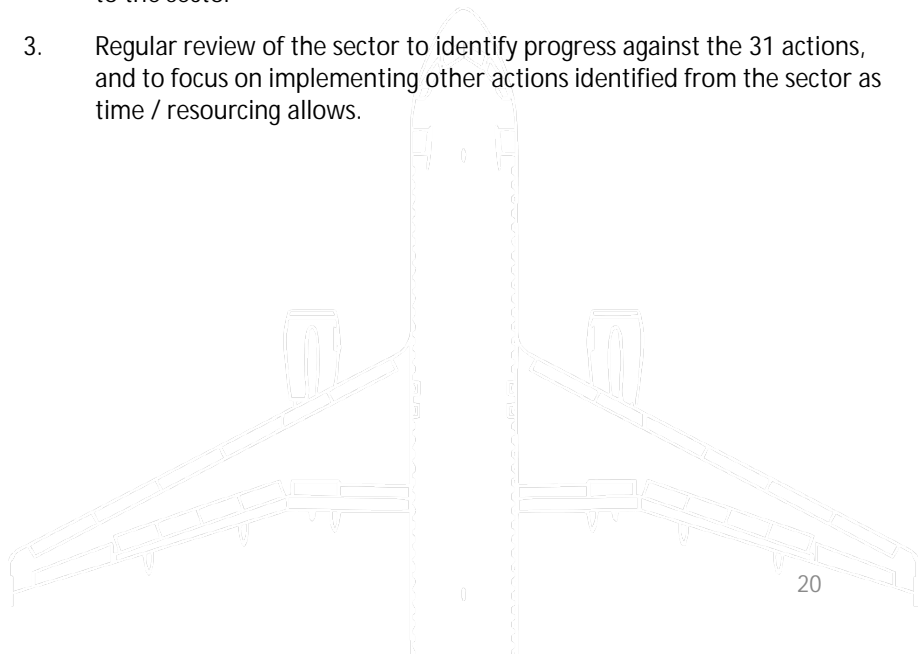
CAA have developed some initial implementation plans to address the 31 actions. While still at a high level, they can be used by participants as they consider how to incorporate the relevant key risk themes within their SMS. The initial implementation plans will be provided on the CAA website (<http://www.caa.govt.nz/safety-info/safety-reports/sector-risk-profiles/>)

3.5 Monitor and review progress

As noted earlier in this report, one of the key outcomes of this SRP process is for operators to include the key risks within their own SMS, and to identify what actions they need to take to manage the risks. While the specifics may differ across participants in the sector, it is anticipated that each key risk should be connected to their SMS.

CAA will play three key roles in monitoring and reviewing the impact of this SRP:

1. Assessing how key risks, controls and actions have been incorporated into a participant's SMS, and the resulting impact on the participant's processes and future safety planning
2. Working alongside the sector to help drive the implementation of actions that require multi-party support, and providing progress reporting back to the sector
3. Regular review of the sector to identify progress against the 31 actions, and to focus on implementing other actions identified from the sector as time / resourcing allows.



SRP progress update – May 2019



3.5 Monitor and review progress

A key step in the sector risk profile process is to monitor and review progress against the 31 actions identified in 2017. To facilitate this process we ran a workshop in March 2019, attended by approximately 40 sector participants. The workshop provided an opportunity to check in on progress across the sector, share common learnings, and identify the next actions required to address the key sector risks.

The workshop was structured as follows:

a. *Considered the relevant data*

In preparation for the workshop, CAA analysed its occurrence data relevant to the 11 SRP risks. The data highlighted that the 11 SRP risks are still relevant to the NZ context. This data was displayed as case examples against each of the risks and participants were encouraged to review each risk and the relevant data case studies.

We also considered the global trends related to the key risks. Particular focus was placed on reviewing data from IATA and ICAO.

b. *Assessed progress of actions*

With the time constraints of one day to run this workshop, we asked participants to identify the top risks that they wanted to explore in detail during the workshop. This resulted in the following five key risks:

- i. Runway excursions
- ii. Runway incursions
- iii. Airborne conflict
- iv. Damage or accident due to aerodrome/ground challenging operating conditions
- v. Compromise of safety to people on aircraft.

Participants selected the risk they wanted to explore, and in groups discussed and agreed the progress made in implementing each of the relevant actions. Each of the 11 risks, with the associated controls and actions were summarised on “half bowties.” These are reproduced in Appendix III for participants to use. The five risks analysed during the workshop include a progress update of actions and the other six risks will be explored in later SRP update work.

c. *Identify key next actions*

Once progress had been assessed, participants then identified the key next actions they believe the Sector should take to make progress against each of the five risks. These are summarised in appendix IV.

SRP progress update – May 2019

Next Steps

At the conclusion of the workshop, participants had identified 16 key actions to further progress the five risks identified. We asked participants how they would like to keep the conversation alive and ensure that future progress is made. A number of suggestions were made, including forming a SRP Steering Group to analyse each of the key actions, assign accountabilities, and measure performance.

This proposal gained the most support and CAA will contact sector participants to identify individuals who would like to join the Steering Group. The Steering Group will agree its mandate, and its action plan with a view to come back in 12 months with measurable progress against the key actions identified.

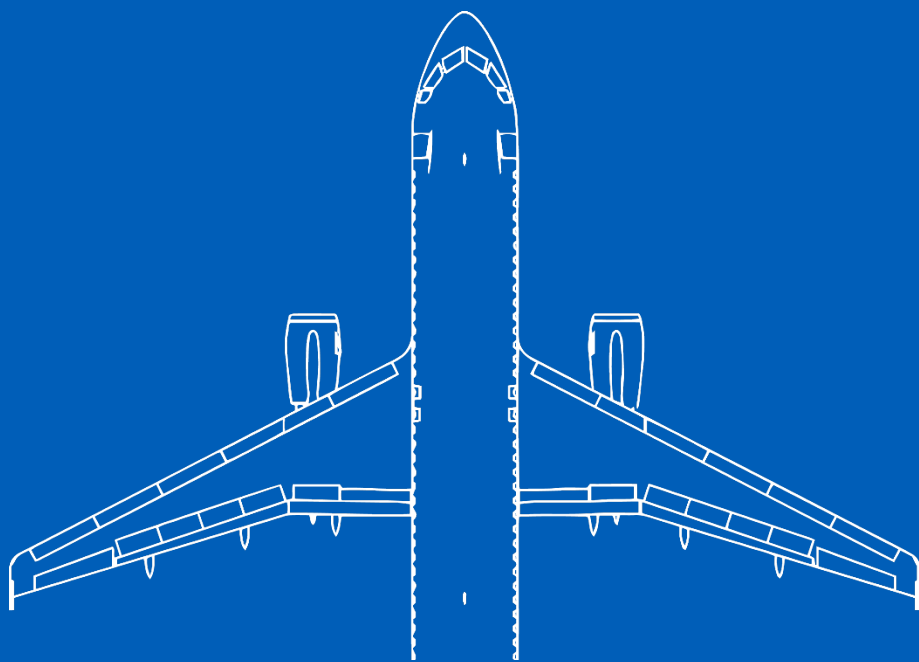
While this update focussed on what the Sector has achieved, participants are still expected to be considering and addressing the relevant risk themes and overarching causes within their own SMS. Going forward, CAA inspectors will be placing specific focus on how participants have addressed the relevant SRP risks within their SMS.

Given the dynamic nature of aviation, participants are also encouraged to conduct regular risk reviews to identify potential new risks and to assess/enhance the effectiveness of existing risk controls. Additional resources include the IATA Safety Report, ICAO Global Aviation Safety Plan (GASP) and the CAA website.



Part 4

Risk Themes



PART 4: DRAFT RISK THEMES

The first workshop identified an initial list of 26 risk themes, and related causes and consequences. The SRP project team took this initial list and reduced the draft list of risk themes to 11 following the process described in Part 3 of this report. In reducing the risks to 11 the SRP project team took into the consideration the following factors:

- The level of risk granularity where meaningful action could be taken, and as a result those risk themes that were more appropriately categorised as causes
- Risks identified that were similar in nature and could be amalgamated
- SRPs previously completed / commenced internationally
- Analysis of occurrence data within New Zealand and internationally
- The New Zealand operating environment and what was viewed as important areas for consideration by the Sector participants during the first workshop .

4.1 Risk themes

Ref	Risk theme	Description
1	Runway excursions	A runway excursion (RE) is a veer off or overrun from the runway surface (ICAO).
2	Runway incursions	A runway incursion is an incident where an unauthorised aircraft, vehicle or person is on a runway. This adversely affects runway safety, as it creates the risk that an airplane taking off or landing will collide with the object.
3	Airborne conflict (Dangerous proximity to airborne objects or aircraft)	Airborne Conflict is the dangerous proximity to airborne objects or aircraft while in flight.
4	Reduction in terrain separation	Controlled flight into terrain (CFIT) is an accident in which an airworthy aircraft, under pilot control, is unintentionally flown into the ground, a mountain, a body of water or an obstacle.
5	Unintended Flightpath Deviation	An aircraft is not in the intended position (i.e. location or under control).
6	Degraded air navigation service (e.g. ATC, coms, navigation, aircraft technology)	Air traffic, ground/space-based nav-aids, and/or aircraft navigation services are degraded or lost.
7	Aircraft unintentionally deviates from normal inflight parameters (aircraft upset)	Controlled flight within the bounds of the aircraft design is suddenly, unexpectedly, and unintentionally, lost.
8	Damage to the aircraft while on the ground	Damage to the aircraft while on the ground.
9	Degraded safety margin (peculiar to NZ environment)	Damage or threats to safe aviation unique to the NZ aviation environment.
10	Compromise of safety to people on aircraft in flight	Decreased safety margin for passengers and crew in the cabin.
11	Aircraft fire/fumes	In flight fire.

4.2 Overarching causes

In addition to the list of 11 draft risk themes, participants also identified three overarching causes that are summarised below for reference. The SRP project team is aware that a number of initiatives are already underway to address these causes. However, we agreed that it was useful for this SRP process to highlight them and to acknowledge their importance within the New Zealand operating environment.

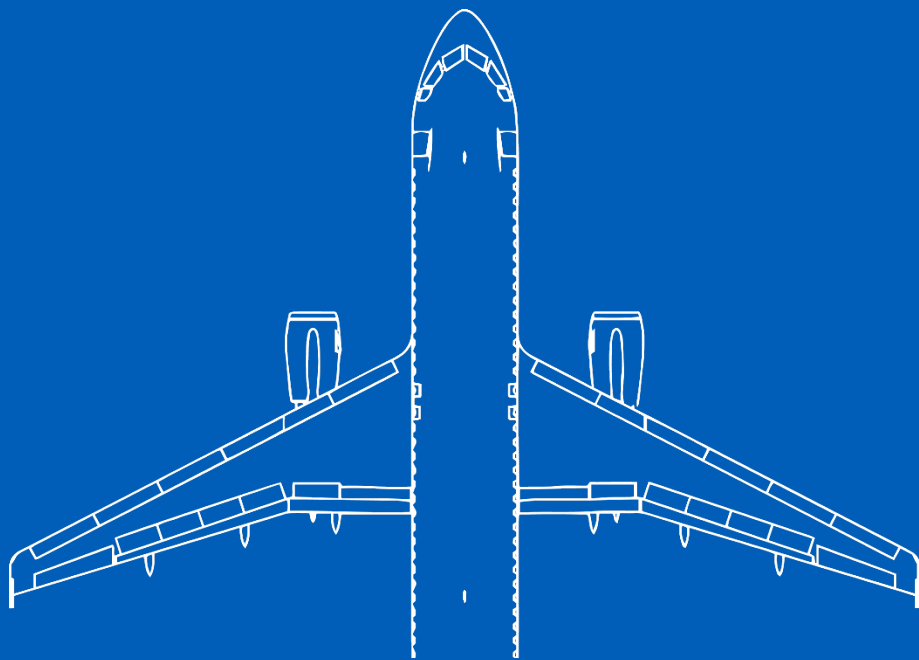
Ref	Overarching cause	Description
1	<p>Regulator agility meaning:</p> <ul style="list-style-type: none"> That the regulatory system fails to provide safety assurance to the sector Failure of government identification, facilitation and implementation of change in the interest of aviation Rules and regulations are outpaced by technological advances – creating incomplete practices 	<ul style="list-style-type: none"> The regulatory system and the operator environment are not aligned. Insufficient analysis, or availability, of data. Insufficient regulatory capacity Insufficient regulatory capability Unaligned regulatory policy Not maintaining pace with technological changes.
2	Human performance limitations (people, culture, procedure)	Human factors. This includes understanding human performance, health, and experience.
3	Ineffective safety culture	The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management.

During the second workshop, CAA presented to participants on the activity already occurring across the sector to address these overarching causes. The presentations also provided opportunity for participants to ask questions of CAA and to provide further feedback on how current / future initiatives could be enhanced. A number of documents were provided on the day that are also referenced in Appendix II for further information.

While CAA does not propose any further work specifically on these causes within the SRP process, there is a clear alignment between each of them and the 31 actions that will be focussed on in the coming one to two years. For that reason it would be helpful for the sector to continue to engage in the various work-streams underway to address the overarching causes, and to review the documents in Appendix II.

Part 5

Key actions



PART 5: KEY ACTIONS

The second SRP workshop focussed on the controls and actions to address the 11 risk themes identified from the first SRP workshop. The second workshop identified 115 possible controls that needed strengthening or development and nearly 200 potential actions (refer to <http://www.caa.govt.nz/safety-info/safety-reports/sector-risk-profiles/> for the complete list).

As noted in Part 3, CAA utilised an expert panel to identify a short list of actions that could be addressed immediately. The panel assessed each of the proposed actions against the following criteria:

- i. Will it have a positive impact on the sector?
- ii. Is it achievable in approximately 24 months?
- iii. Is it actually feasible?
- iv. Does it have general alignment with other/international activity (CASA, CAA UK etc.)?
- v. Will it address NZ unique factors?
- vi. Is it supported by known data?

This process resulted in a refined list of 31 actions that will be revisited and updated regularly to ensure actions are being progressed, and to decide whether additional actions should be added. The actions are not designed to be detailed, and we understand that specific actions may differ across operators and other participants in the sector.

5.1 How to read the action statements

Risk	
Risk	This is the risk definition.
Cause	The causes identified in the workshops. Risks may have multiple causes.
Control	The controls identified in the workshops. Risks may have multiple controls.
Action	The proposed action(s)
Owner	The proposed action owner(s)
Status	Active or Scoping
	Active: means the action has already been implemented or action is currently being undertaken. Action owners will be able to show evidence of this action.
	Scoping: means the action is in the early stages of design and implementation. Action owners will be able to show evidence of activity to begin implementation.

PART 5: KEY ACTIONS

5.2 Key actions

1. Runway excursions	
Risk	A runway excursion (RE) is a veer off or overrun from the runway surface. These surface events occur while an aircraft is taking off or landing, and involve many factors ranging from unstable approaches to the condition of the runway. (ICAO)
Cause	1.1 - Inadequate control and monitoring (Flight Operations).
Control	Up-to-date CRM techniques and training.
Action	Airlines - Evidence of ongoing CRM refresher activity. CAA – Monitor and advise on crew training.
Owner	Airlines and CAA.
Status	Scoping

1. Runway excursions	
Risk	A runway excursion (RE) is a veer off or overrun from the runway surface. These surface events occur while an aircraft is taking off or landing, and involve many factors ranging from unstable approaches to the condition of the runway. (ICAO)
Cause	1.2 - Pilot competency and experience.
Control	Competency based training.
Action	Participation in educational outreach on Runway Excursions (e.g. a seminar including recent IATA work on Runway Safety).
Owner	Airlines and CAA.
Status	Scoping

1. Runway excursions	
Risk	A runway excursion (RE) is a veer off or overrun from the runway surface. These surface events occur while an aircraft is taking off or landing, and involve many factors ranging from unstable approaches to the condition of the runway. (ICAO)
Cause	1.3a - Unstable approach.
Control	ATC "Fly the Plan" initiative. Airline promotion of safe clearance acceptance.
Action	ATC to continue "Fly the Plan" initiative and monitor effectiveness. Airline promotion of safe clearance acceptance. Education of ATC on factors leading to unstable approach by ATC. Establish a stable approach criteria (e.g. same as flight safety foundation, and make unstable approaches a reportable event.)
Owner	Airways and Airlines.
Status	Active

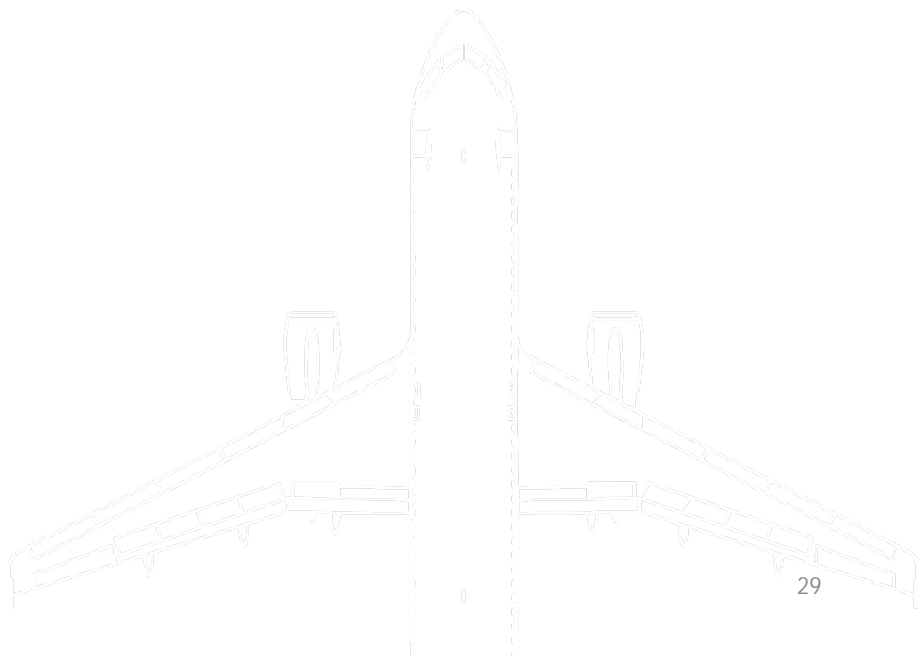
1. "Fly the Plan" is a campaign to raise awareness of the importance of a predictable flight profile and a stabilized approach and the role Air traffic Control can play in contributing to a stable approach. – Airways NZ.

PART 5: KEY ACTIONS

5.2 Key actions

1. Runway excursions	
Risk	A runway excursion (RE) is a veer off or overrun from the runway surface. These surface events occur while an aircraft is taking off or landing, and involve many factors ranging from unstable approaches to the condition of the runway. (ICAO)
Cause	1.3b - Unstable approach.
Control	Adhere to SOPs for unstable approaches and monitoring.
Action	Participation in CAA-led sector educational outreach on Runway Excursions. National Runway Safety Group established.
Owner	Airlines, Aerodromes, Airways and CAA.
Status	Scoping

1. Runway excursions	
Risk	A runway excursion (RE) is a veer off or overrun from the runway surface. These surface events occur while an aircraft is taking off or landing, and involve many factors ranging from unstable approaches to the condition of the runway. (ICAO)
Cause	1.4 - Runway surface conditions.
Control	Real-conditions surface condition monitoring and provision.
Action	Aerodromes to continue to provide surface monitoring service at applicable aerodromes. National Runway Safety Group established.
Owner	Aerodromes and CAA.
Status	Active



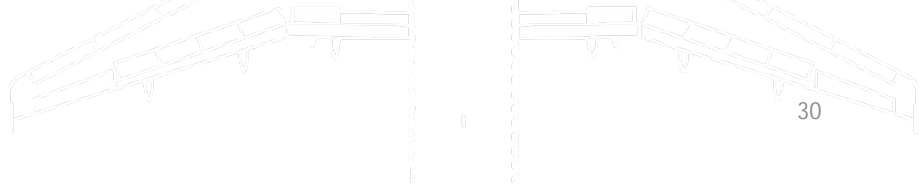
PART 5: KEY ACTIONS

5.2 Key actions

2. Runway incursions	
Risk	A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft (ICAO).
Cause	2.1 - ATS and Pilot fatigue.
Control	Understanding and management of runway incursion events related to ATS and Pilot Fatigue.
Action	Establish, implement and monitor an appropriate FRM training and management addressing. Assess for effectiveness.
Owner	Airways, Pilots association, and Airlines.
Status	Active

2. Runway incursions	
Risk	A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft (ICAO).
Cause	2.2 - Pilots, drivers, ATS, and aerodrome personnel misunderstanding.
Control	Modern technology solutions implemented to monitor surface movement.
Action	Aerodromes, Airways and Airlines - Develop and implement procedures with ADS-B/MLAT (or equivalent technology that provides electronic visibility) - (Auckland approved, case by case thereafter). AIP phraseology content review and improvement (e.g. Holding point phraseology). CAA – Assess for regulatory intervention. National Runway Safety Group established.
Owner	Aerodromes, Airways and Airlines. CAA.
Status	Active

2. Runway incursions	
Risk	A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft (ICAO).
Cause	2.3 - Unclear/non-standardized runway signage or lighting.
Control	Standard aerodrome signage and lighting meets rules specifications. CAA ensures rules and exemptions are up-to-date and fit for purpose.
Action	Aerodromes to ensure compliance with CAR 139. (E.g. AIP Supplements and NOTAM for runway works, etc.). CAA to assess rules and exemptions to ensure appropriateness. National Runway Safety Group established.
Owner	Aerodromes and CAA.
Status	Active



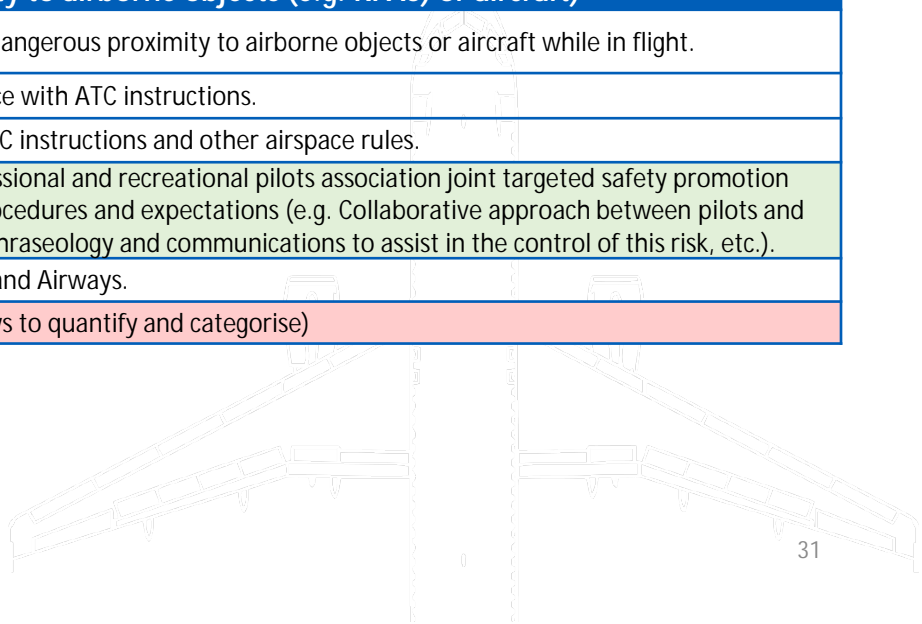
PART 5: KEY ACTIONS

5.2 Key actions

3. Airborne conflict (Dangerous proximity to airborne objects (e.g. RPAS) or aircraft)	
Risk	Airborne Conflict is the dangerous proximity to airborne objects or aircraft while in flight.
Cause	3.1 - Air Traffic Service error.
Control	Enhance the ATS safety performance monitoring system. Ensure safety analysis outputs are fed back across the organisation.
Action	CAA and Airways use combined safety performance analysis to inform evidence based/competency training across all staff. Airways to monitor performance in order to find better ways of reducing critical incidents across the organisation.
Owner	CAA and Airways.
Status	Scoping

3. Airborne conflict (Dangerous proximity to airborne objects (e.g. RPAS) or aircraft)	
Risk	Airborne Conflict is the dangerous proximity to airborne objects or aircraft while in flight.
Cause	3.2 - Lack of situational awareness.
Control	Use appropriate Frequency management. Frequencies must be sectorised appropriately.
Action	CAA led policy development (e.g. rationalisation within Class G) - CAA safety promotion activity.
Owner	CAA.
Status	Scoping

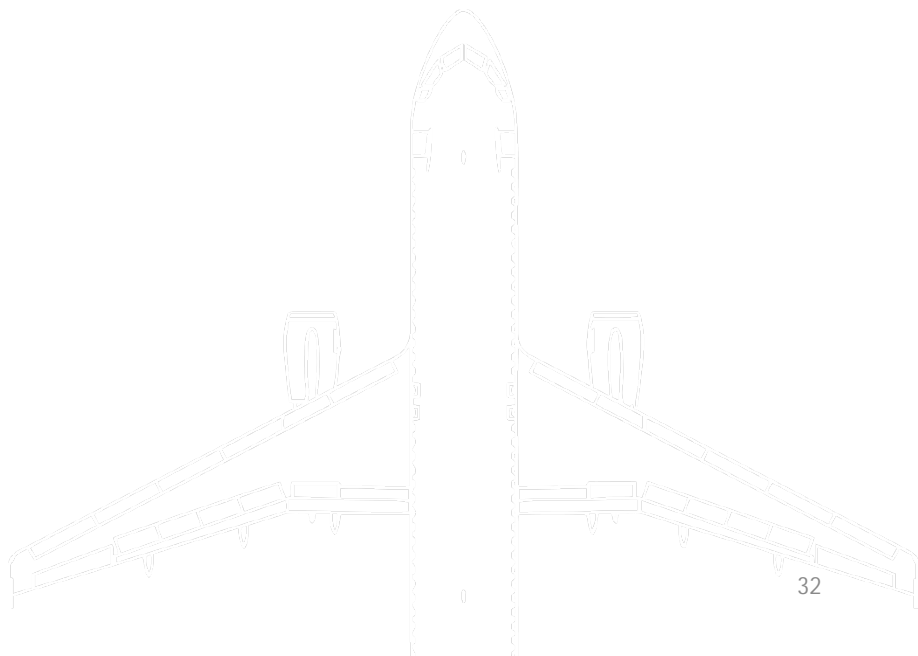
3. Airborne conflict (Dangerous proximity to airborne objects (e.g. RPAS) or aircraft)	
Risk	Airborne Conflict is the dangerous proximity to airborne objects or aircraft while in flight.
Cause	3.3 - Pilot non-compliance with ATC instructions.
Control	Pilot compliance with ATC instructions and other airspace rules.
Action	Airways, CAA, and professional and recreational pilots association joint targeted safety promotion activity to clarify ATC procedures and expectations (e.g. Collaborative approach between pilots and controllers to focus on phraseology and communications to assist in the control of this risk, etc.).
Owner	Pilots Association, CAA, and Airways.
Status	Scoping (CAA and Airways to quantify and categorise)



PART 5: KEY ACTIONS

5.2 Key actions

3. Airborne conflict (Dangerous proximity to airborne objects (e.g. RPAS) or aircraft)	
Risk	Airborne Conflict is the dangerous proximity to airborne objects or aircraft while in flight. This can include other piloted aircraft and RPAS.
Cause	3.4 – Unauthorised RPAS operating in controlled airspace.
Control	User compliance with CAR 101 and existing airspace rules.
Action	CAA education to all users. Educational outreach to 102 and wider GA, sports aircraft. Airlines to report RPAS activity.
Owner	CAA, Airlines, Aerodromes, and GA sector.
Status	Airlines reporting RPAS activity is active. Scoping (CAA to continue monitoring and risk assessment)

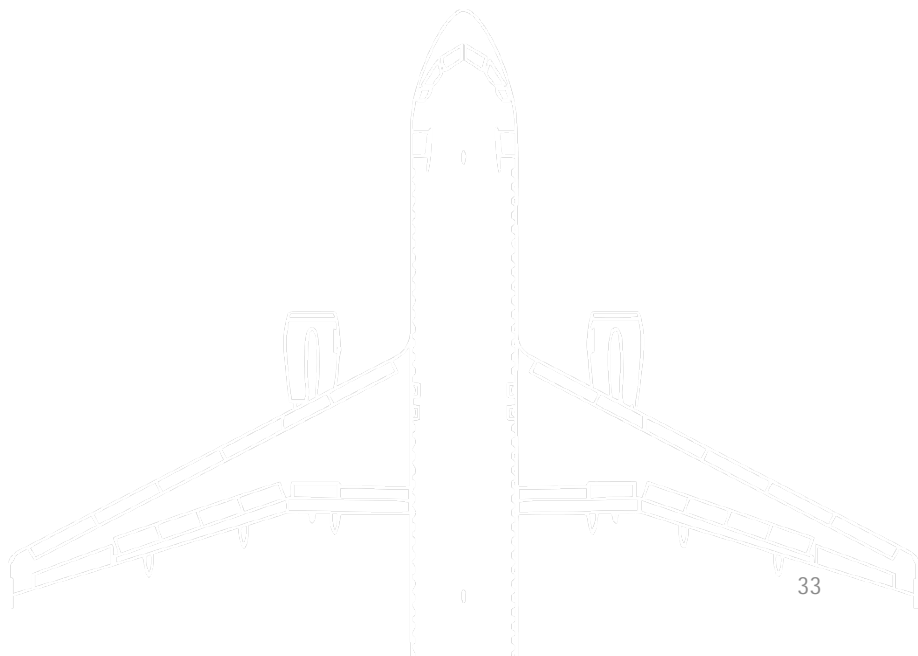


PART 5: KEY ACTIONS

5.2 Key actions

4. Reduction in Terrain Separation	
Risk	Similar to Controlled flight into terrain (CFIT), in the NZ context, Reduction In Terrain Separation can involve aerodrome terrain challenges, landing short of the runway, warnings, and adverse weather.
Cause	4.1 - Lack of specific PBN approach competency, including local experience and familiarity.
Control	a) Education. Consider what other aviation authorities have done in this area. b) ALAR (Approach and Landing Accident Reduction) Toolkit.
Action	Greater promulgation of PBN approach with APV (Approaches with Vertical guidance). Ensure properly trained crews. The NSS includes a range of projects that are beginning to address the needs in this area including a PBN regulatory framework and crew competency requirements.
Owner	NSS, CAA, Airways, and Airlines.
Status	Scoping

4. Reduction in Terrain Separation	
Risk	Similar to Controlled flight into terrain (CFIT), in the NZ context, Reduction In Terrain Separation can involve aerodrome terrain challenges, landing short of the runway, warnings, and adverse weather.
Cause	4.2 - Loss of situational awareness.
Control	Training to improve pilot situational awareness.
Action	CAA and industry work collaboratively to analyse data and share safety initiatives. Build on threat and error management principles. Airlines and pilots to engage with Threat and Error Management.
Owner	CAA, pilots association and Airlines
Status	Scoping



PART 5: KEY ACTIONS

5.2 Key actions

5. Unintended Flight Path Deviation	
Risk	Organisational flight operations factors that, over time, lead to an aircraft not being in its intended position. This includes such factors as CRM, communication, flight path management, planning, airworthiness, and air traffic management.
Cause	5.1 - Fatigue
Control	Identify and address systemic procedures leading to fatigue.
Action	CAA is engaging with the industry through the Fatigue Risk Management Panel. CAA and the industry need to work with representatives of the scientific and research sector to identify opportunities to recognise and reduce the causes of fatigue.
Owner	CAA, Pilots Association, and Airlines
Status	Active

5. Unintended Flight Path Deviation	
Risk	Organisational flight operations factors that, over time, lead to an aircraft not being in its intended position. This includes such factors as CRM, communication, flight path management, planning, airworthiness, and air traffic management.
Cause	5.2a - Mismanaging aircraft automation.
Control	Enhanced crew competency in use of automation.
Action	<ul style="list-style-type: none"> a) Part 121/125 operators to enhance recurrent and upgrade training with appropriate automation competency assessment and evidence based training b) Operators with Single Pilot Operations to consider multi-pilot operations as part of SMS, for flights that have greater threats/risks. CAA to investigate hours credit for co-pilots c) usage of VVM for flight crew (verbalise, verify, monitor)
Owner	<ul style="list-style-type: none"> a) Airlines and CAA. b) Airlines and CAA.
Status	Scoping

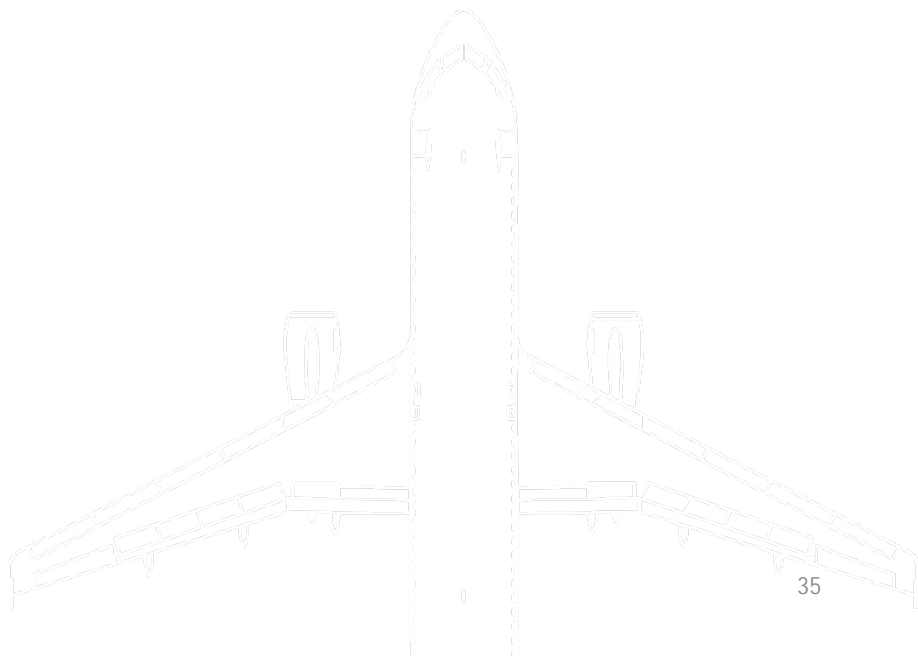
5. Unintended Flight Path Deviation	
Risk	Organisational flight operations factors that, over time, lead to an aircraft not being in its intended position. This includes such factors as CRM, communication, flight path management, planning, airworthiness, and air traffic management.
Cause	5.2b - Mismanaging aircraft automation.
Control	OEM A/C instructions and operational needs based on best practice used to develop clear SOPs.
Action	<p>Analysis to establish if there is a link between Airline SOPs and any differences between OEM aircraft recommended SOPs and analysis of difference in SOPs between airlines and operating practices within airlines.</p> <p>Operators to demonstrate effective flight path management policies (e.g. Operators to have flight path management/automation policy, and CAA assessment to ensure it is consistent with requirements of 121.77)</p>
Owner	CAA and Airlines.
Status	Scoping

PART 5: KEY ACTIONS

5.2 Key actions

6. Degraded air navigation service (e.g. ATC, coms, navigation, aircraft technology)	
Risk	Air traffic and/or air navigation services are degraded or lost. This includes the ATS capacity (human/technical), capability (Human/Technical), infrastructure, and aircraft navigation systems both internal and external (dependant on external navigation data providers).
Cause	6.1 - Ineffective change management.
Control	Appropriate planning, governance, and structures.
Action	PBN Regulatory framework, GBNA Review Panel, NSS working group.
Owner	NSS, CAA, Airlines and Airways.
Status	Active

6. Degraded air navigation service (e.g. ATC, coms, navigation, aircraft technology)	
Risk	Air traffic and/or air navigation services are degraded or lost. This includes the ATS capacity (human/technical), capability (Human/Technical), infrastructure, and aircraft navigation systems both internal and external (dependant on external navigation data providers).
Cause	6.2 – Unfamiliarity with legacy systems (flying or air traffic management) for emergency use.
Control	Training and Competency.
Action	ATC and Airlines to demonstrate proficiency on legacy systems (Airways) and non-precision approaches (Airlines).
Owner	Airways and Airlines.
Status	Active



PART 5: KEY ACTIONS

5.2 Key actions

7. Aircraft unintentionally deviates from normal inflight parameters. (Aircraft Upset)	
Risk	Controlled flight within the bounds of the aircraft design is suddenly, unexpectedly, and unintentionally, lost
Cause	7.1 - Over reliance on automation/Pilot lack of knowledge of aircraft systems and procedures.
Control	Competency based training including use of automation. Recurrency training and ongoing evaluation.
Action	Evidence based training, UPRT, and competency assessments based on enabling skills (e.g. TEM, pilot monitoring, assertiveness and challenge, decision making, operator policies/procedures for flight path management including cross-check, deviation call outs, escalation protocol – up to and including controls take-over, competency standards of the trainers, manual flying in a certain controlled condition [in line with IATA recommendation], etc.).
Owner	CAA and Airlines
Status	Active

7. Aircraft unintentionally deviates from normal inflight parameters. (Aircraft Upset)	
Risk	Controlled flight within the bounds of the aircraft design is suddenly, unexpectedly, and unintentionally, lost.
Cause	7.2 - Pilot loss of situational awareness.
Control	Training should include upset recovery including STARTLE factor.
Action	UPRT and competency assessments based on enabling skills (e.g. TEM, pilot monitoring, assertiveness and challenge, decision making, operator policies/procedures for flight path management including cross-check, deviation call outs, escalation protocol – up to and including controls take-over, etc.).
Owner	CAA and Airlines.
Status	Active

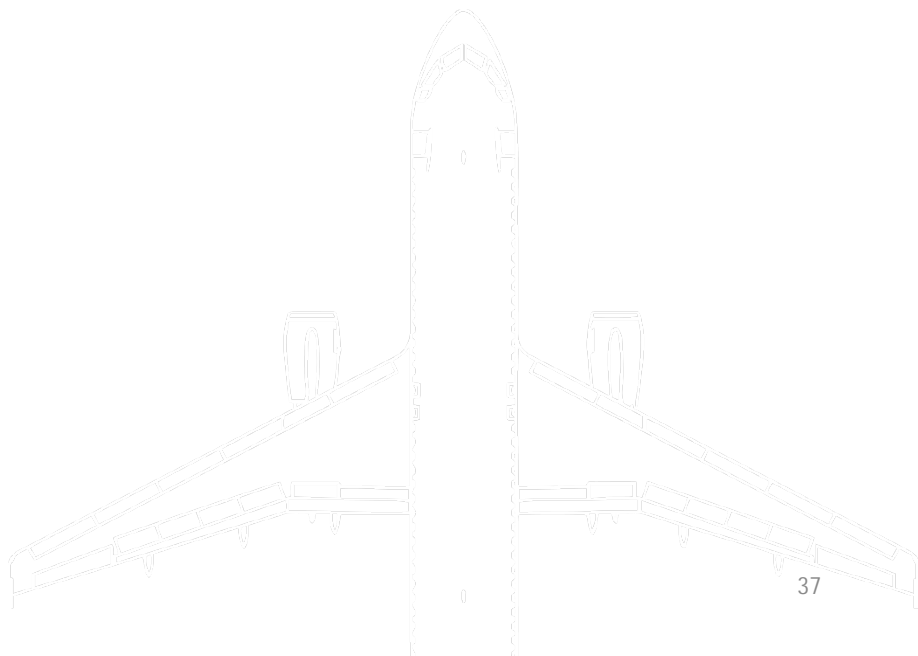
7. Aircraft unintentionally deviates from normal inflight parameters. (Aircraft Upset)	
Risk	Controlled flight within the bounds of the aircraft design is suddenly, unexpectedly, and unintentionally, lost.
Cause	7.3 – Unreported/unnoticed damage to aircraft on ground and/or improper loading, leading to aircraft not responding as designed or an unbalanced load.
Control	Appropriate ground handling SOPs and training.
Action	Education outreach on ground handling management including operator processes for quality and safety management oversight of ground handlers (including contractors) and crew pre-flight activity training. Implementation of Just Culture to encourage hazard reporting.
Owner	Airlines, Aerodromes and CAA.
Status	Scoping

PART 5: KEY ACTIONS

5.2 Key actions

8. Damage or accident due to aerodrome/ground challenging operating conditions	
Risk	Damage to aircraft while taxiing or parked, due to other vehicles, ground staff, and while loading or unloading, or preparing for takeoff.
Cause	8.1 – Ineffective promulgation of aerodrome infrastructure operations and developments.
Control	Appropriate promulgation of works in progress.
Action	Regular updates on progress and changes, coordinated by stakeholders to all - single clear message. (E.g. AIP Supplements and NOTAM for runway works, etc.) Airlines and aerodromes coordinate risk management planning around taxiing and parking areas, FOD management, etc.
Owner	Aerodromes, Airlines, and CAA.
Status	Scoping

8. Damage or accident due to aerodrome/ground challenging operating conditions	
Risk	Damage to aircraft while taxiing or parked, due to other vehicles, ground staff, and while loading or unloading, or preparing for takeoff.
Cause	8.2 - Variable performance of ground handlers.
Control	Supervision, performance, oversight.
Action	Aerodrome and Airlines to work together to reduce damage to aircraft. CAA could assist with quantification of problem, coordination of approach, educational outreach (e.g. clarification of ground responsibilities – [apron vs manoeuvring area] to reduce the taxi/pushback conflicts.) Encourage hazard reporting amongst ground handlers.
Owner	Airlines, Aerodromes and CAA.
Status	Scoping



PART 5: KEY ACTIONS

5.2 Key actions

9. Degraded safety margin (peculiar to NZ environment)	
Risk	Factors unique to the NZ aviation environment. This can include single runway operations, variable terrain, unique island topography, and changeable and extreme meteorological conditions.
Cause	9.1 - Single runway operations.
Control	Appropriate operator Flight planning, fuel policies, fuel planning. CAA surveillance (e.g. Part 129, 121 ramp checks.) Appropriate ATC traffic management training.
Action	Operators and ATC demonstrate appropriate SMS activity.
Owner	Airways, CAA, and Airlines.
Status	Scoping

9. Degraded safety margin (peculiar to NZ environment)	
Risk	Factors unique to the NZ aviation environment. This can include single runway operations, variable terrain, and unique island topography, changeable and extreme meteorological conditions.
Cause	9.2 - Unexpected and compounded adverse changes in weather.
Control	Appropriate weather forecasting promulgated to relevant users. Use of advanced technology to assist with weather information.
Action	Enhanced communication of PIREPS for any unforeseen significant weather systems. Airways and operators to anticipate, plan for, and encourage re-routing where necessary. AWS and SIGMETs.
Owner	Pilots Association, Airways, and Metservice.
Status	Forecasting and re-routing around bad weather - Active
	Improved PIREPS, use of new/advanced technology - Scoping

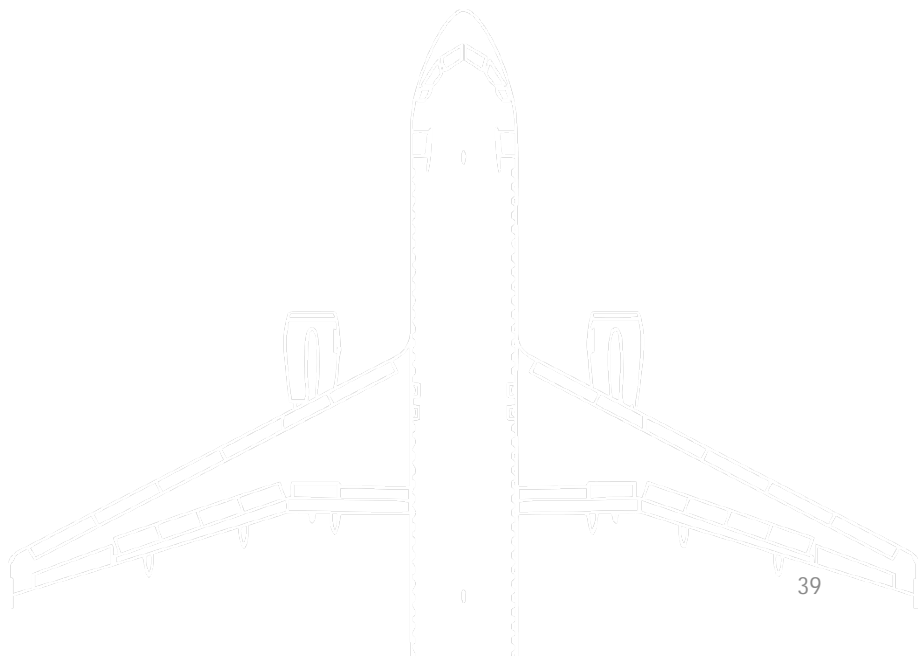
9. Degraded safety margin (peculiar to NZ environment)	
Risk	Factors unique to the NZ aviation environment. This can include single runway operations, variable terrain, and unique island topography, changeable and extreme meteorological conditions.
Cause	9.3 - Unique topography for key aerodromes.
Control	Location training and familiarity for aircrew to standards.
Action	Operators to provide evidence of location specific training for high threat environments. Operator SMS will demonstrate risk management and mitigation controls (e.g. per SMS, risk managed and mitigating controls should be included in exposition [e.g. Route and Aerodrome Manual], etc.).
Owner	Airlines.
Status	Scoping

PART 5: KEY ACTIONS

5.2 Key actions

10. Compromise of safety to people on aircraft	
Risk	Decreased safety margin for passengers and crew in the cabin. This can include aircraft comfort facilities, unruly passengers, impact of severe weather on cabin environment.
Cause	10.1 - Adverse weather (e.g. severe turbulence, storms).
Control	Real-time weather information made available to pilots.
Action	Increased encouragement of PIREPS and ensuring Airways are passing on weather information. AWS and SIGMETs
Owner	CAA, Airways, and Pilots Association.
Status	Scoping

10. Compromise of safety to people on aircraft	
Risk	Decreased safety margin for passengers and crew in the cabin. This can include aircraft comfort facilities, unruly passengers, impact of severe weather on cabin environment.
Cause	10.2 - Passenger behaviour (including unruly passengers, cabin baggage, smoking etc.).
Control	a) High threat passenger list. b) Develop learning, data analysis and sharing between participants.
Action	a) Airlines to work together to share high threat passenger information. b) CAA to investigate impact/potential of national caution list, unruly pax penalties issues assessment. c) CAA to work with airlines to share occurrence data.
Owner	Airlines and CAA.
Status	Scoping

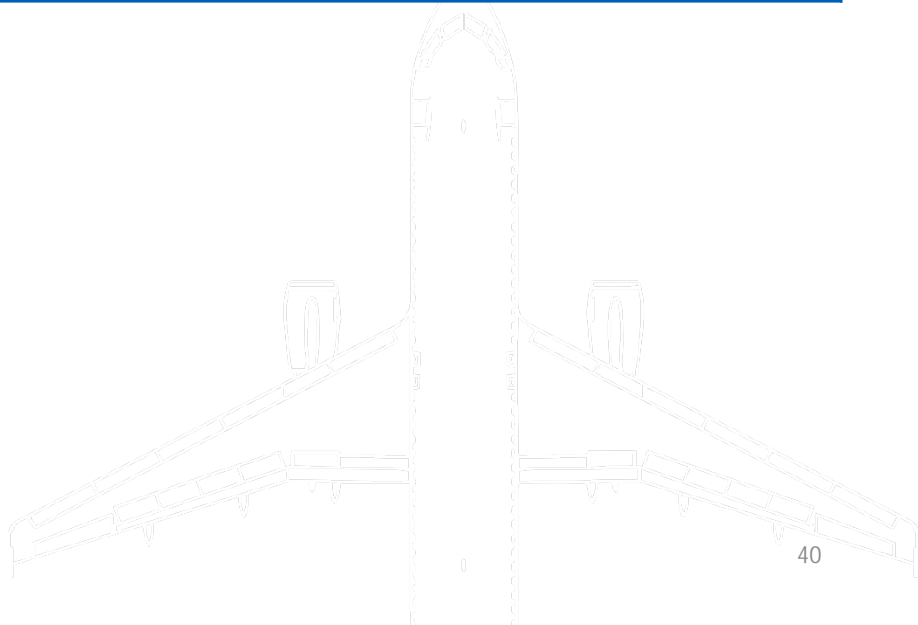


PART 5: KEY ACTIONS

5.2 Key actions

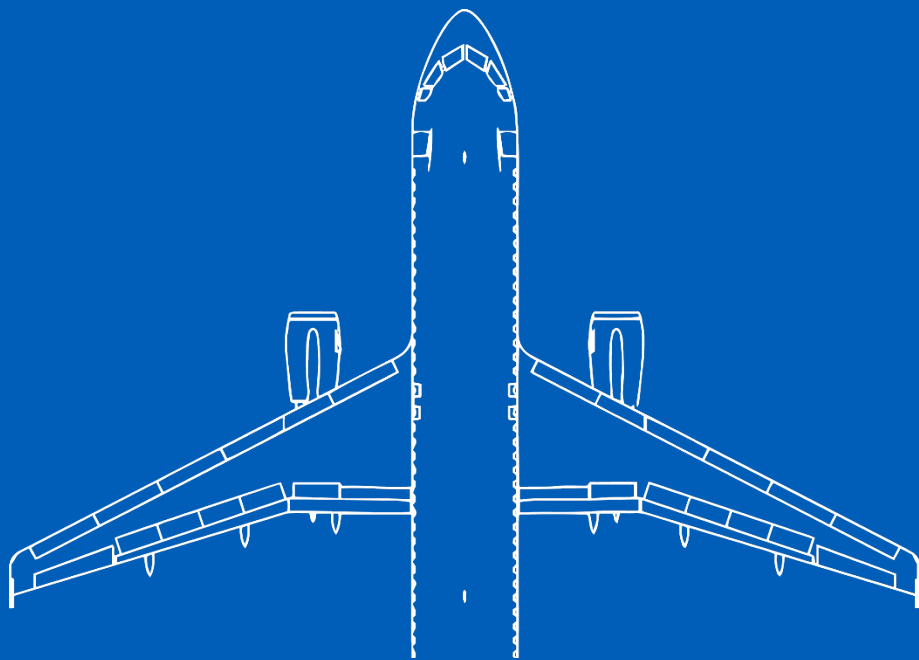
11. Aircraft fire/fumes	
Risk	Inflight fire. This can include engine fire, cabin fire (including from passenger PEDs), hidden fire (including Dangerous Goods), smoke and fumes, and heat.
Cause	11.1 – Inappropriate use and stowage of Lithium batteries.
Control	Public and sector education.
Action	Update DG information on CAA website and dangerous goods poster, kiosks. CAA awareness campaign to members of the public and shippers (freight forwarders) i.e. What is a lithium battery? What does it look like? What is good practice for transporting lithium batteries as passenger/shipper? Enforcement of requirement to declare dangerous goods. Operators to publish DG information on website and during check-in.
Owner	CAA and Airlines.
Status	Scoping

11. Aircraft fire/fumes	
Risk	Inflight fire. This can include engine fire, cabin fire (including from passenger PEDs), hidden fire (including Dangerous Goods), smoke and fumes, and heat.
Cause	11.2 - Undeclared dangerous goods.
Control	a) Public and sector education of dangerous goods. b) Loading and handling surveillance.
Action	a) CAA has introduced the Dangerous Goods Panel, is beginning to raise awareness of dangerous goods, and working with operators to identify and reduce the areas of risk. b) Operators to ensure dangerous goods training and monitoring of loading operations is part of SMS where appropriate, and specifically includes handling of lithium batteries.
Owner	a) CAA b) Airlines
Status	Scoping



Appendix I

Full list of risk themes

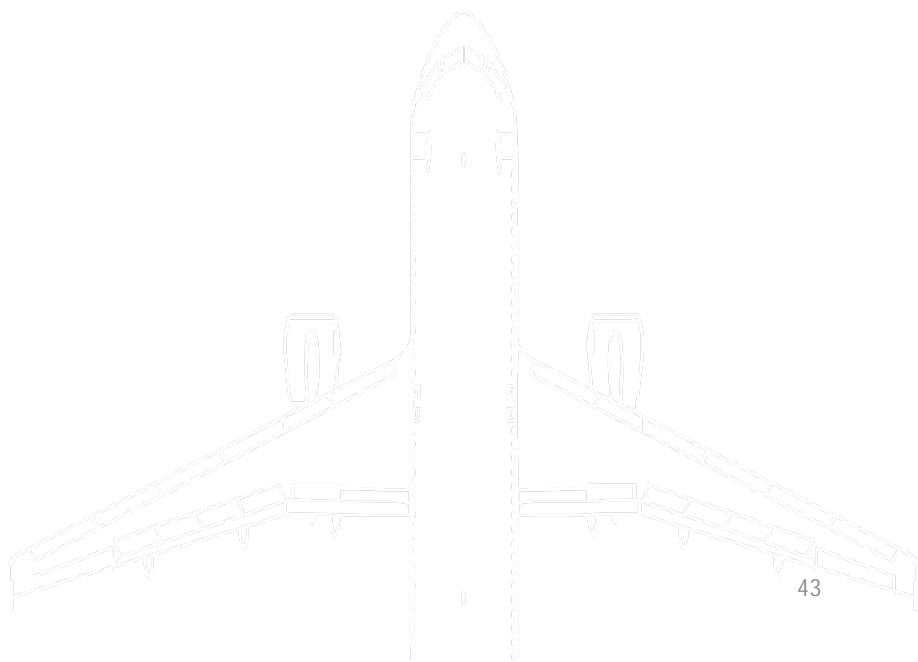


APPENDIX I – FULL LIST OF RISK THEMES

The first workshop identified an initial list of 26 risk themes, and related causes and consequences. We have listed this original list below, along with some brief commentary on how these were summarised to the final 11 risk themes and three overarching causes.

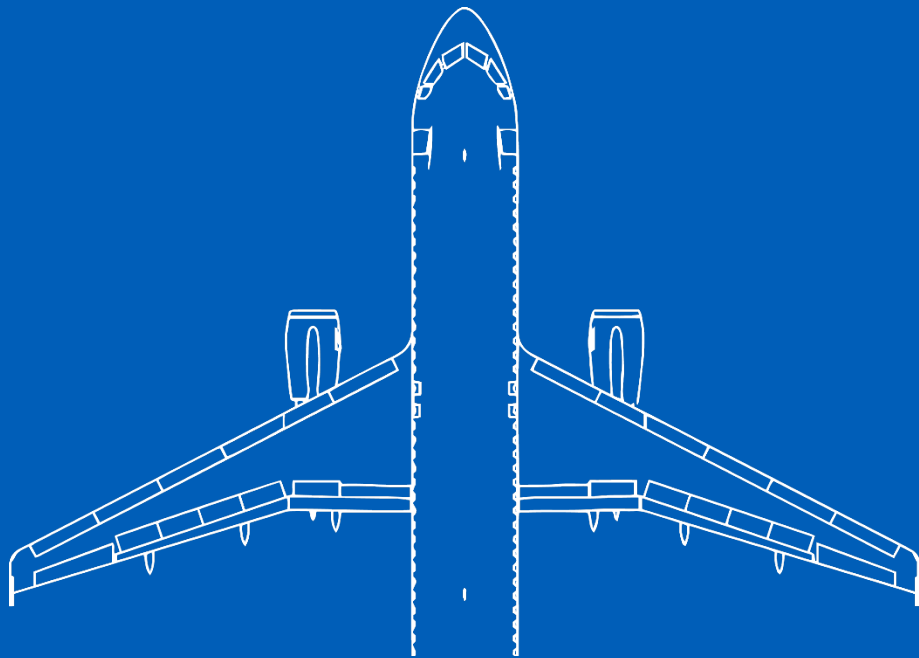
Ref	Original risk theme identified	Commentary
1	Runway excursions	Retained as key risk theme
2	Latent health issues	Re-categorised as a cause (will also be addressed under "Human performance limitations")
3	Dangerous proximity to airborne objects or aircraft	Retained and title changed to "Airborne conflict (dangerous proximity to airborne objects or aircraft)"
4	Degraded / no ATC service available due to service failure	Retained and title changed to "Degraded air navigation service (e.g. ATC, coms, navigation, aircraft technology)"
5	Ineffective SMS	Incorporated as an overarching cause "Ineffective safety culture"
6	Undesired aircraft state due to technical failures	Incorporated within "Aircraft unintentionally deviates from normal inflight parameters (aircraft upset)"
7	Aircraft airborne with less than legal fuel reserve (sufficient fuel)	Incorporated within "Aircraft unintentionally deviates from normal inflight parameters (aircraft upset)"
8	Runway incursions	Retained as key risk theme
9	Ineffective safety management (SMS)	Repeat of 5 above - Re-categorised as a cause
10	Risk of damage or accident due to challenging operating conditions	Incorporated within two risk themes - "Degraded safety margin (peculiar to NZ environment)" and "Damage to the aircraft while on the ground"
11	Aircraft exceeds safe operating design envelope	Incorporated within "Aircraft unintentionally deviates from normal inflight parameters (aircraft upset)"
12	Reduction in terrain separation	Retained as key risk theme
13	Adverse environmental factors encountered by aircraft	Incorporated within "Degraded safety margin (peculiar to NZ environment)"
14	Regulatory system fails to provide safety assurance to the sector	Incorporated within overarching cause "Regulator agility"
15	Failure of government identification, facilitation and implementation of change in the interest of aviation safety	Incorporated within overarching cause "Regulator agility"
16	Rules and regulations are outpaced by technological advances – creating incomplete practices	Incorporated within overarching cause "Regulator agility"
17	Risk of injury or compromise of safety to people on aircraft	Reworded to key risk theme "Compromise of safety to people on aircraft in flight"
18	Human performance limitations (people, culture, procedure)	Incorporated as an overarching cause "Human performance limitations"

Ref	Original risk theme identified	Commentary
19	Ineffective organisational structure	Re-categorised as a cause under overarching theme "Human performance limitations"
20	Risk of commercial drivers compromising flight or airport operational safety	Re-categorised as a cause under risk theme "Reduction in Terrain Separation." May also come up under other risk themes.
21	Shortage of qualified and experienced personnel	Re-categorised as a cause (will also be addressed under "Human performance limitations")
22	Integration of RPAS into aviation environment	Re-categorised as a cause under risk theme "Airborne conflict"
23	Ineffective safety culture	Incorporated as an overarching cause "Ineffective safety culture"
24	Flight Path Deviation	Reworded to key risk theme "Unintended flight path deviation"
25	Human performance limitations while piloting	Incorporated as an overarching cause "Human performance limitations"
26	Inflight fire/fumes	Reworded to key risk theme "Aircraft fire/fumes"



Appendix II

Key reference points



APPENDIX II – KEY REFERENCE POINTS

Readers may find the following reference points useful when reviewing this report:

GENERAL INFORMATION ON SECTOR RISK PROFILING

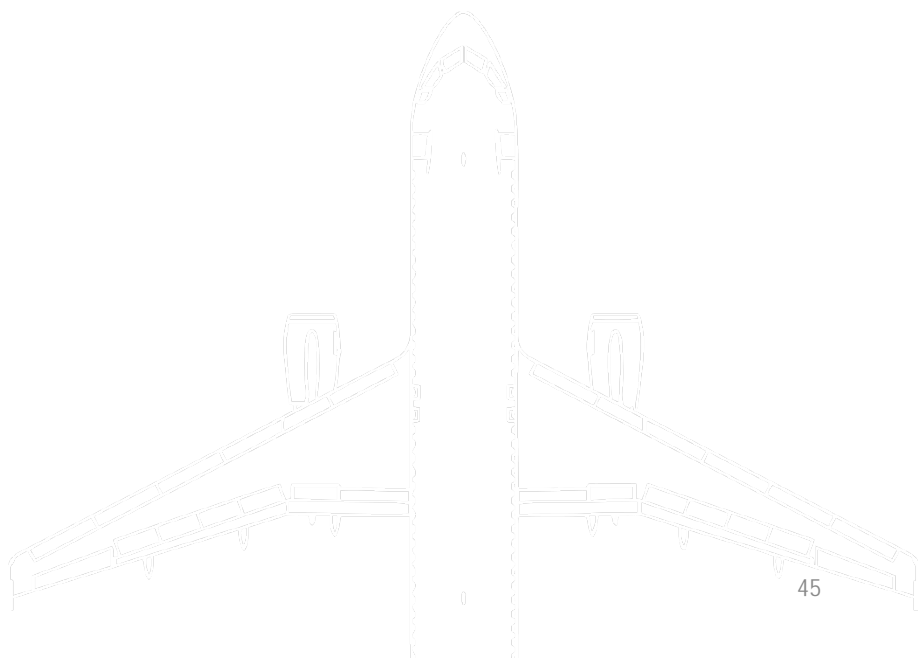
Document title	Document link
<i>Civil Aviation Authority</i>	http://www.caa.govt.nz/safety-info/safety-reports/sector-risk-profiles/
<i>Civil Aviation Safety Authority</i>	https://www.casa.gov.au/standard-page/risk-profiling-aviation-sectors-better-safety-outcomes
<i>UK CAA guidance on Bowtie approach within the context of SMS and SRP</i>	https://www.caa.co.uk/Safety-Initiatives-and-Resources/Working-with-industry/Bowtie/

Full list of Causes and Actions emerging from Workshop # 2 –

<http://www.caa.govt.nz/safety-info/safety-reports/sector-risk-profiles/>

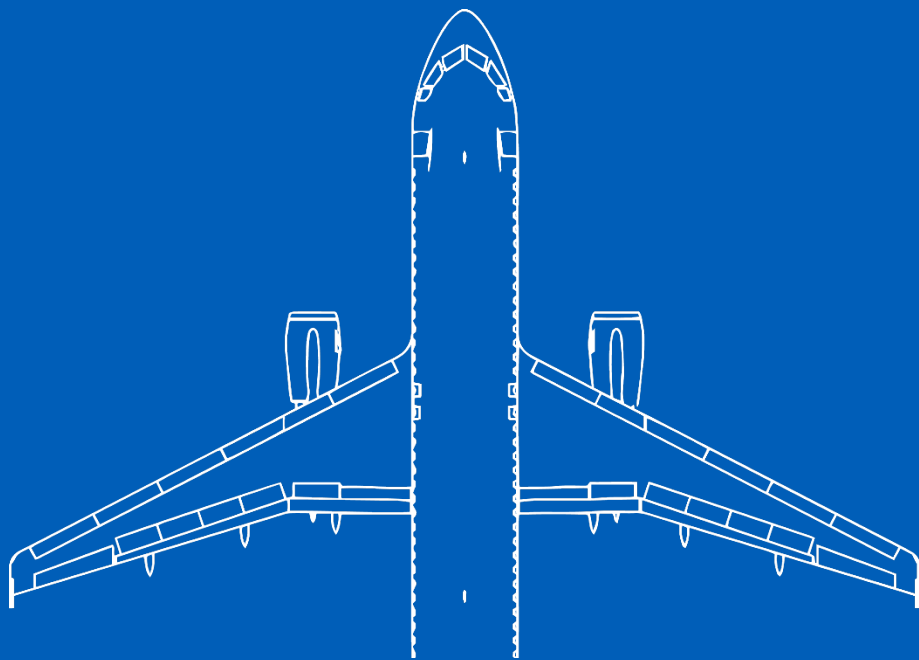
Documents relating to the overarching causes that were presented in Workshop # 2

<http://www.caa.govt.nz/safety-info/safety-reports/sector-risk-profiles/>



Appendix III




Summary of Progress against key actions

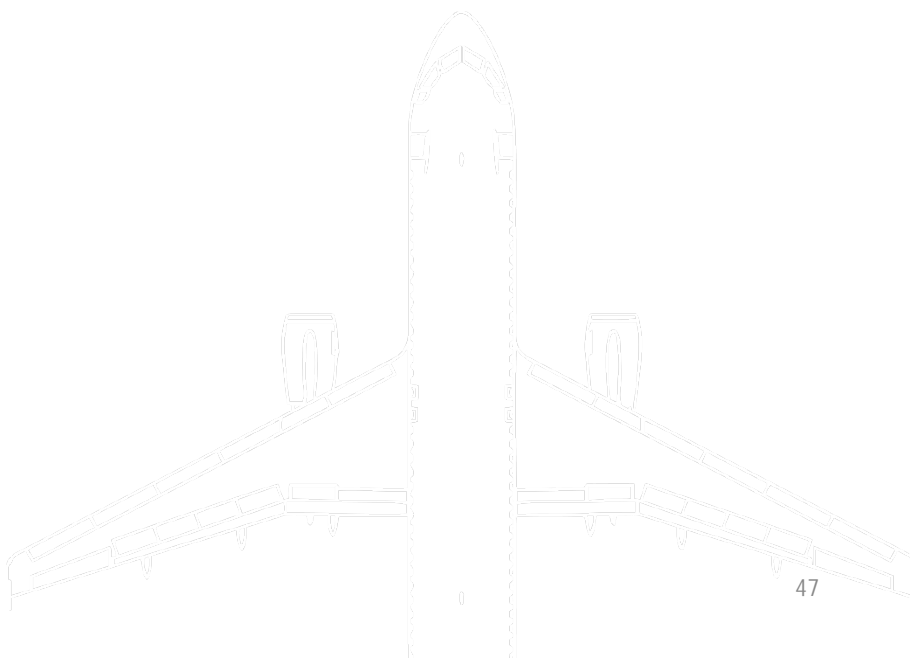


APPENDIX III – SUMMARY OF PROGRESS AGAINST KEY ACTIONS

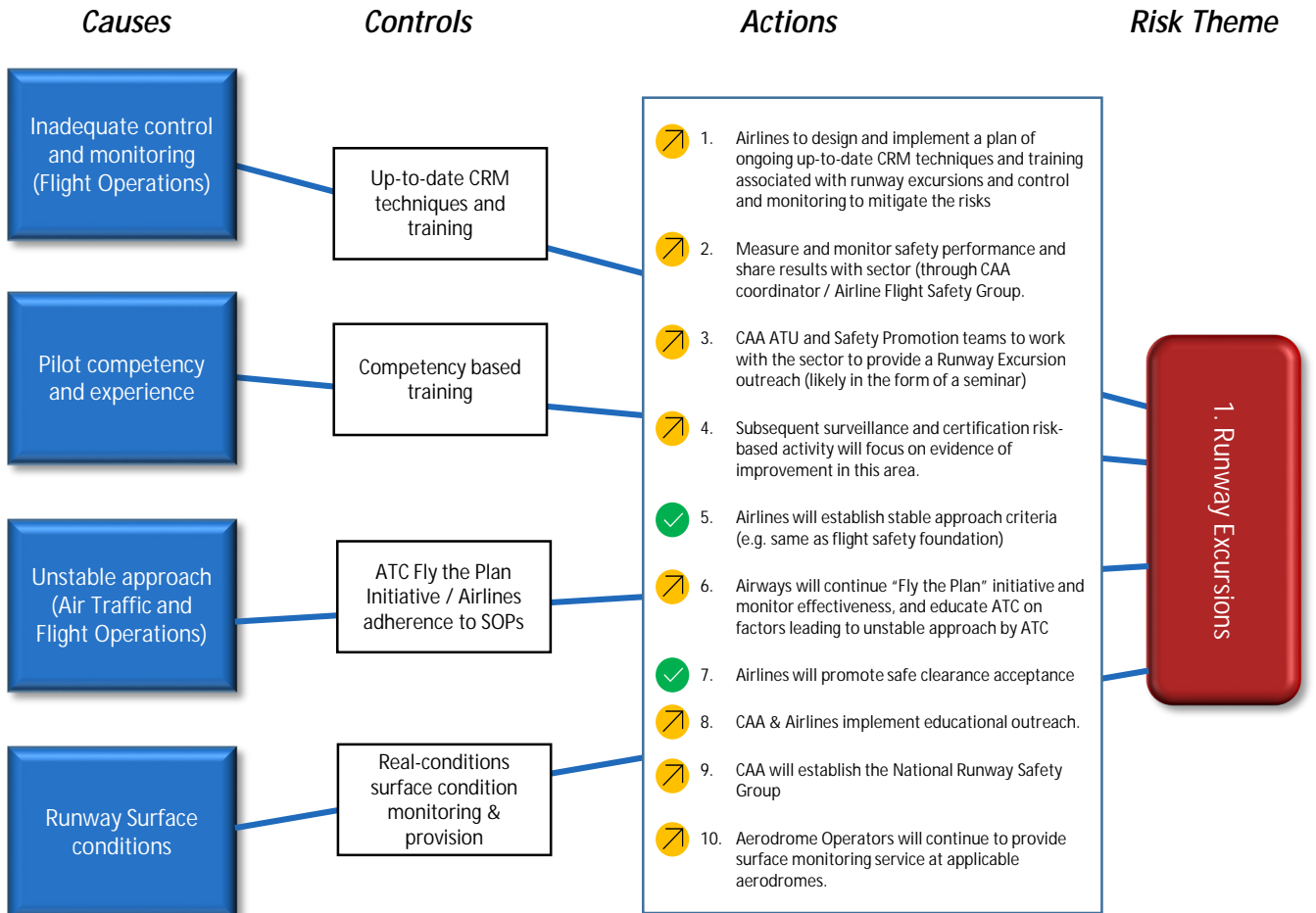
On the following pages we have reproduced a “half-bowtie” for each of the 11 SRP risk themes. Those that were reviewed during the update workshop in March 2019 are indicated along with a progress update rating as concluded by the workshop participants.

The progress update ratings are defined as follows:

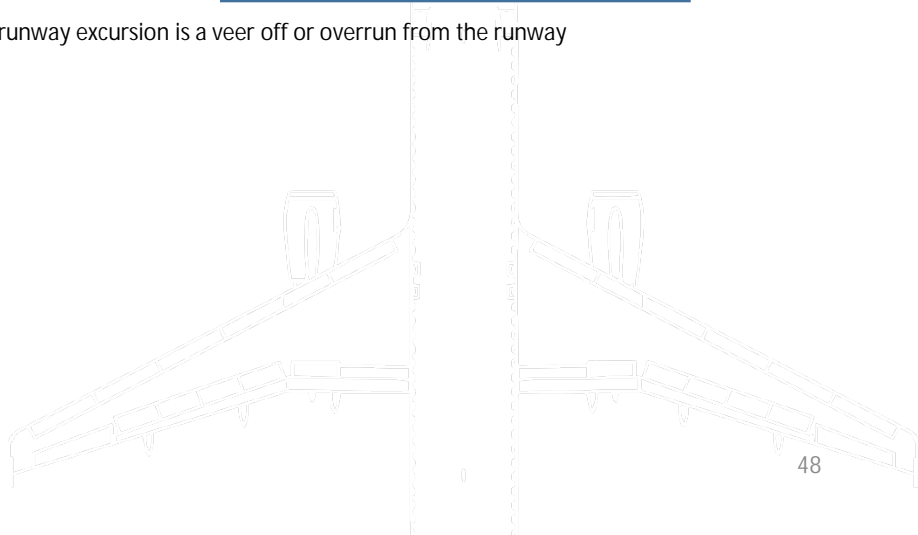
-  On-track or complete
-  Commenced but further work required
-  Not started or not on track or no longer considered a priority action



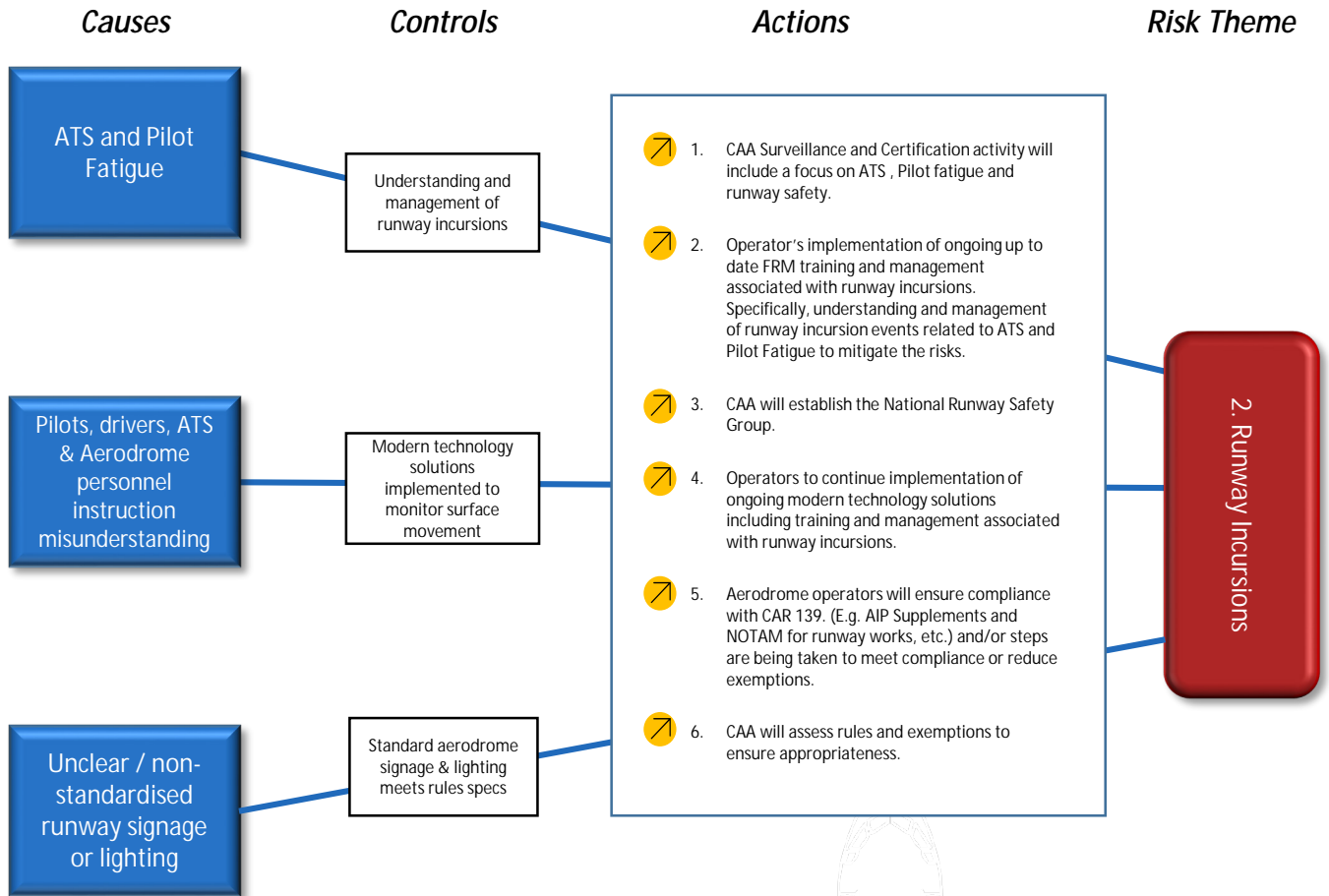
Risk 1 – Runway excursions



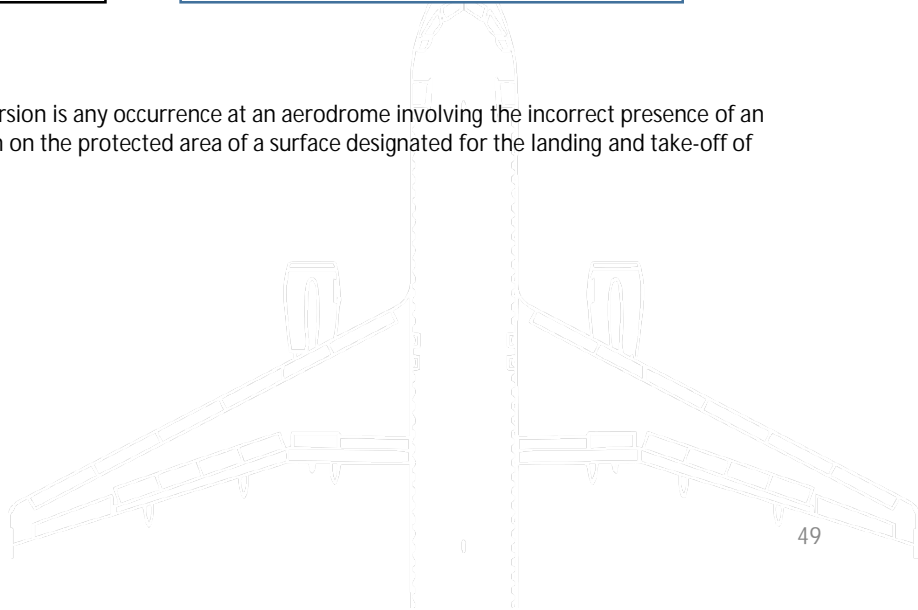
Definition: A runway excursion is a veer off or overrun from the runway surface



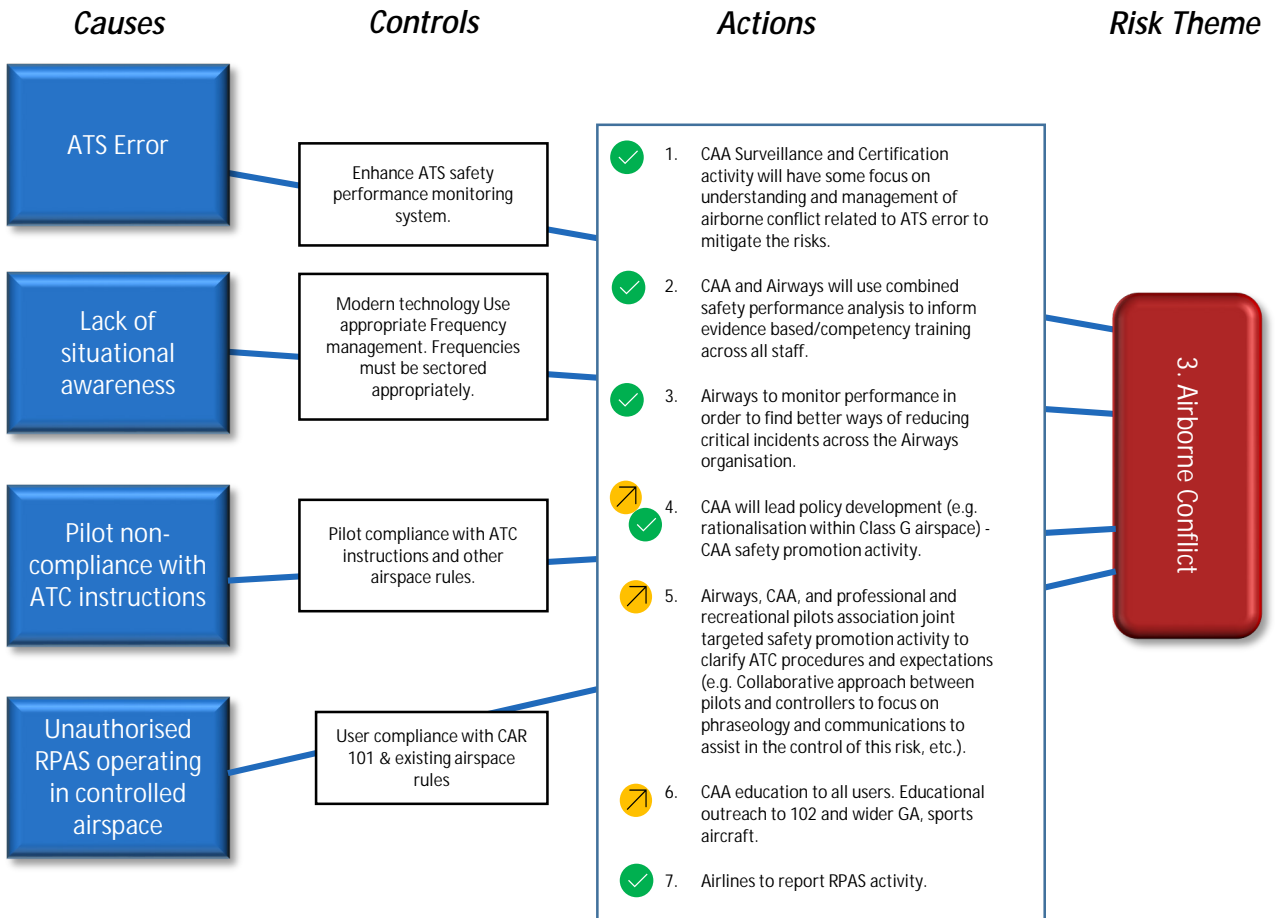
Risk 2 – Runway incursions



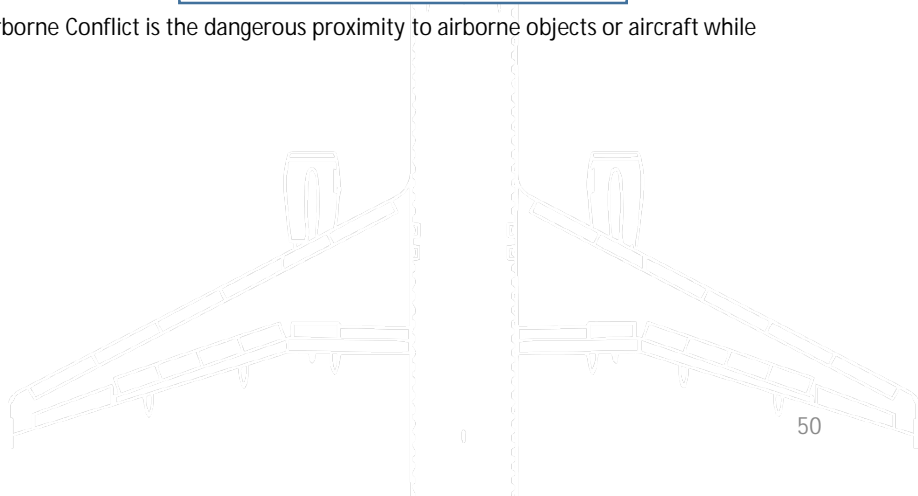
Definition: A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft



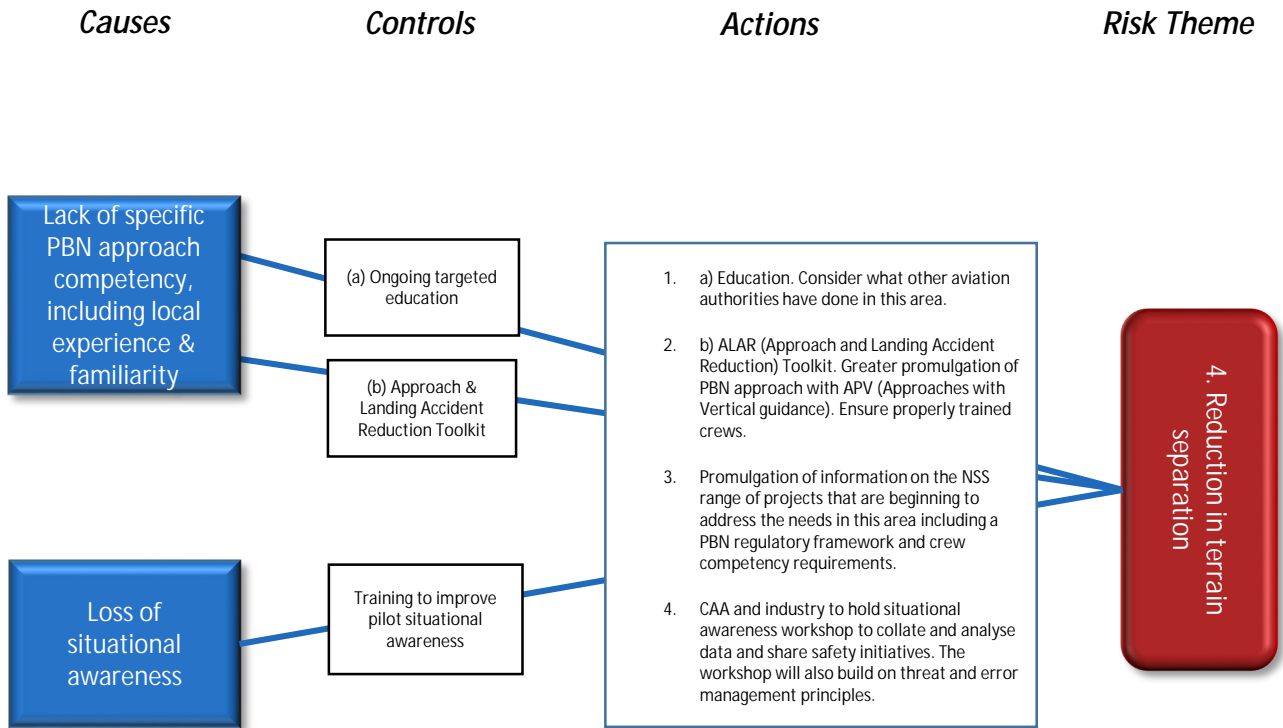
Risk 3 – Airborne conflict



Definition: Airborne Conflict is the dangerous proximity to airborne objects or aircraft while in flight.



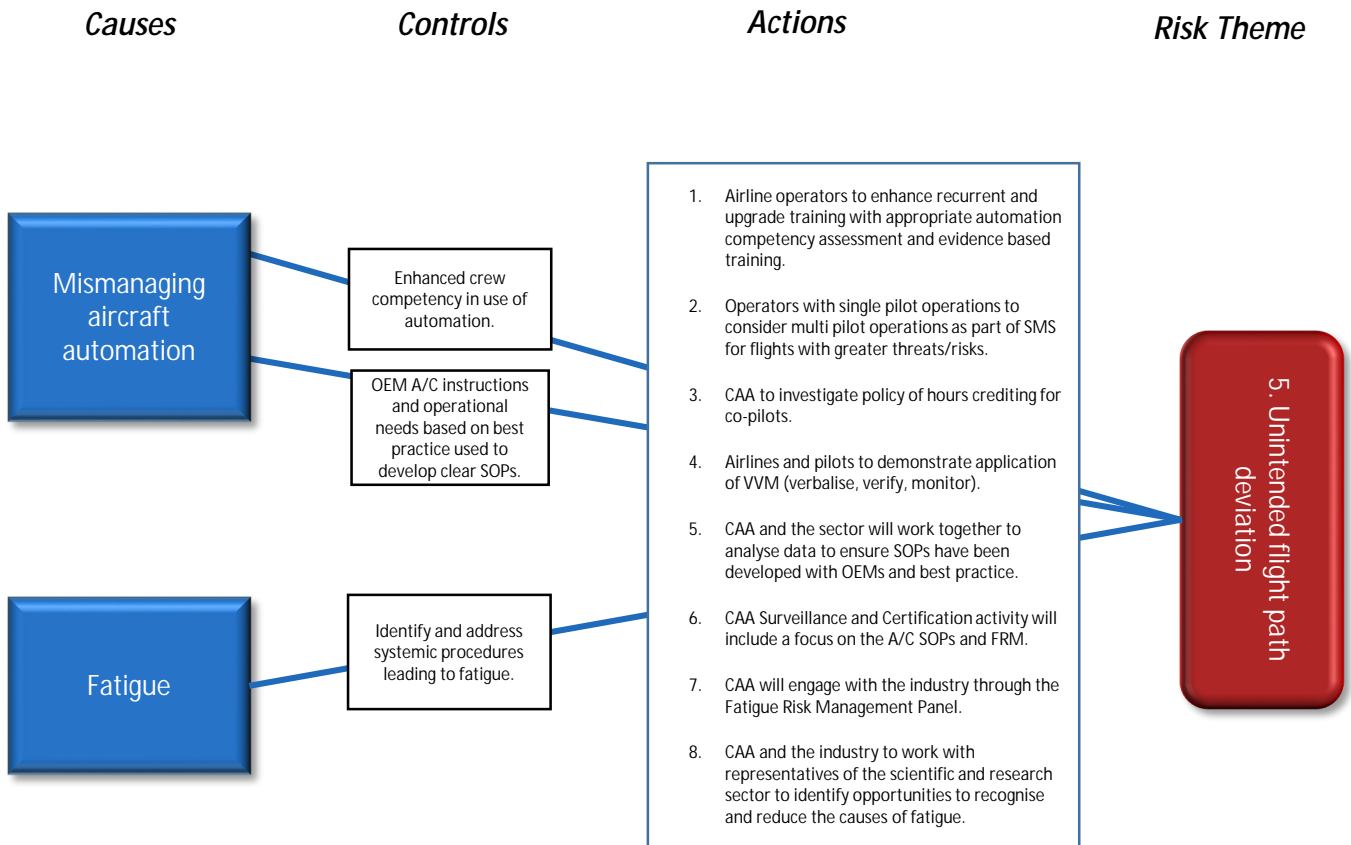
Risk 4 – Reduction in terrain separation



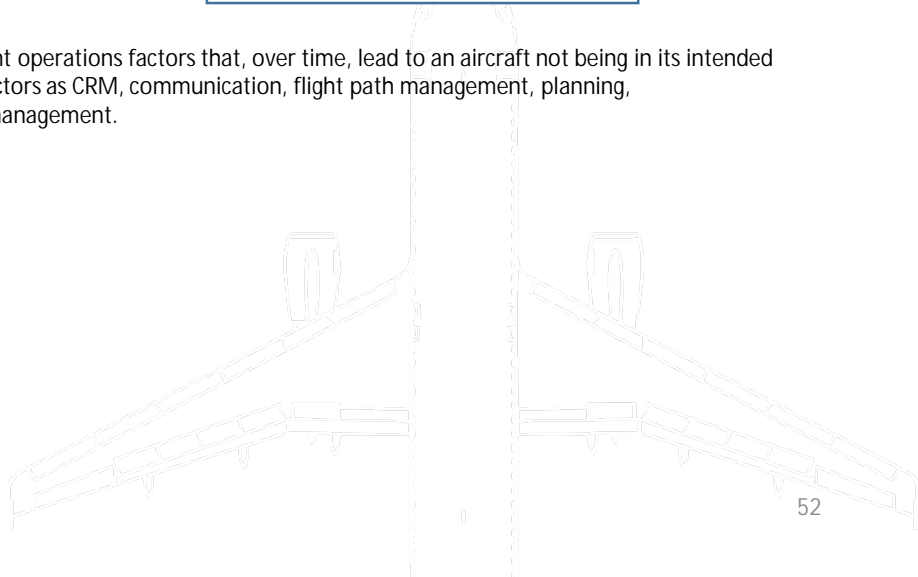
Definition: Similar to Controlled flight into terrain (CFIT), in the NZ context, Reduction In Terrain Separation can involve aerodrome terrain challenges, landing short of the runway, warnings, and adverse weather.



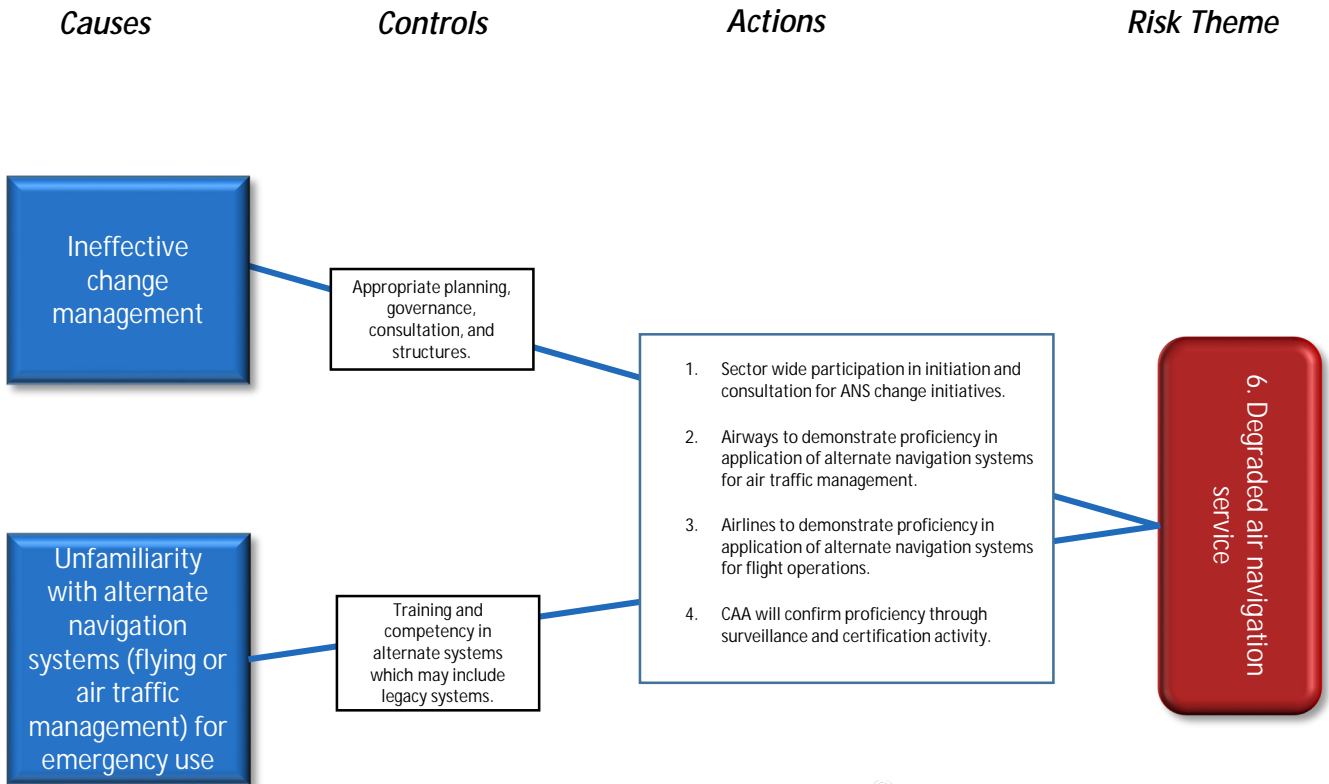
Risk 5 – Unintended flightpath deviation



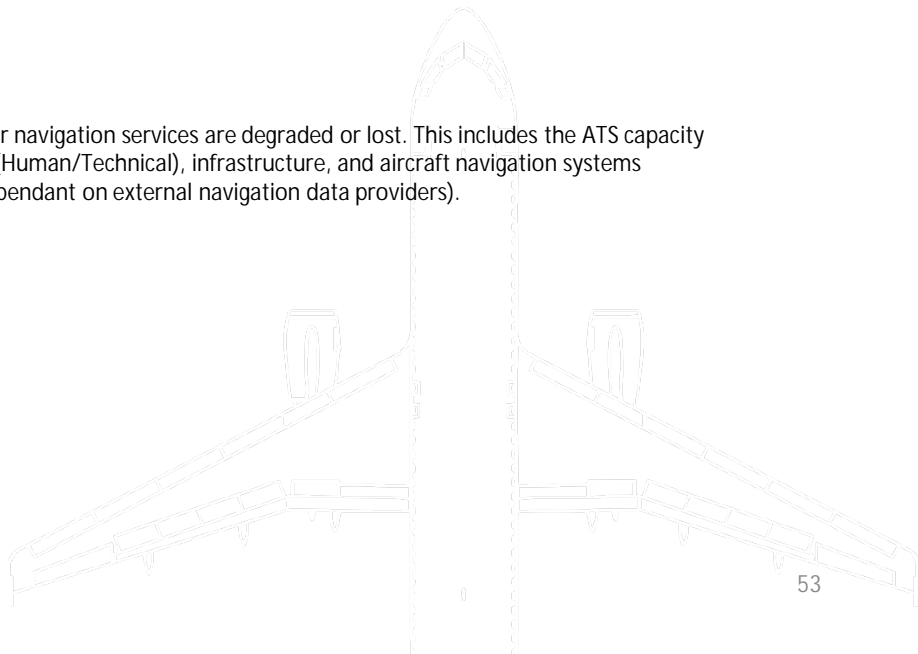
Definition: Organisational flight operations factors that, over time, lead to an aircraft not being in its intended position. This includes such factors as CRM, communication, flight path management, planning, airworthiness, and air traffic management.



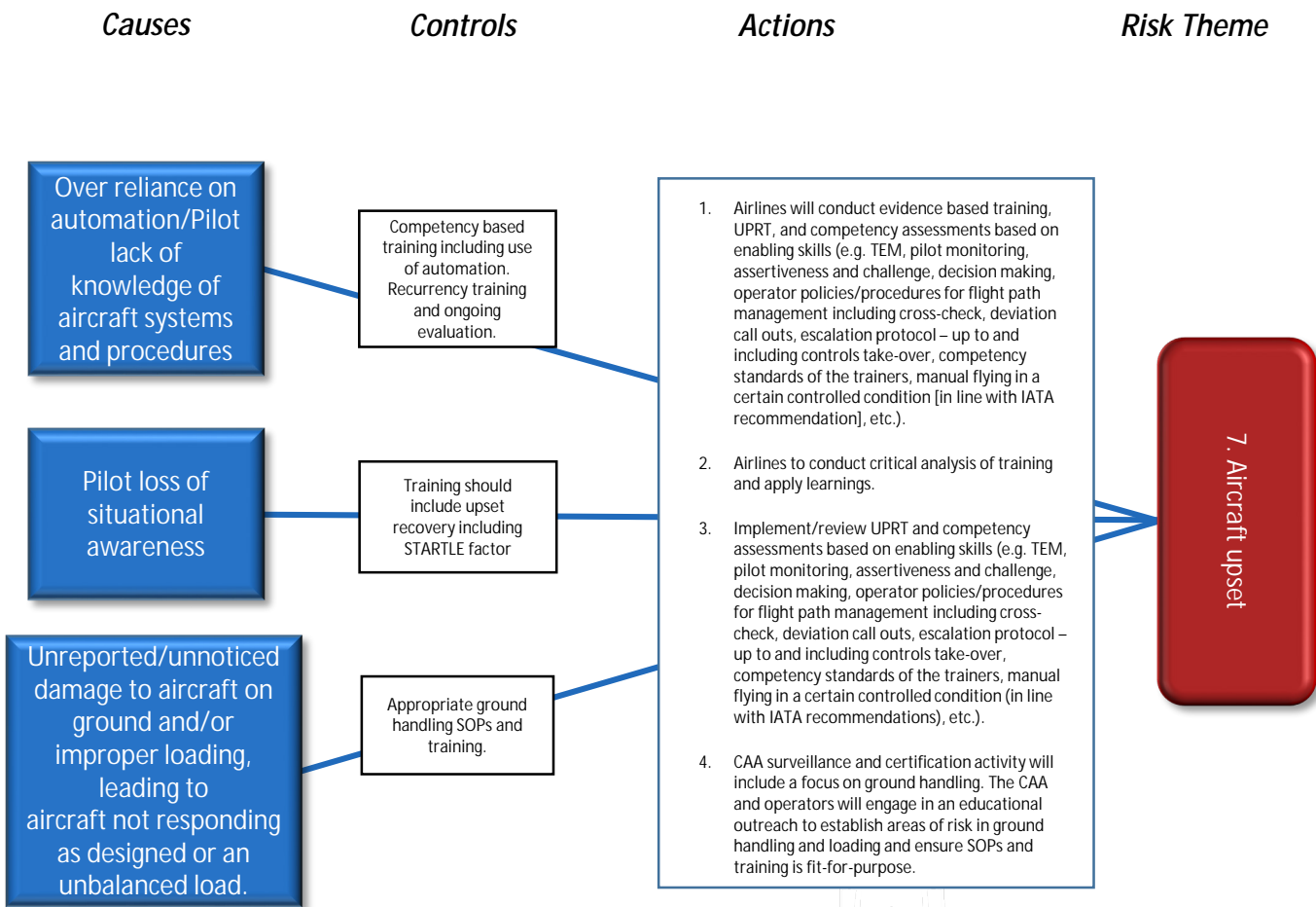
Risk 6 – Degraded air navigation service



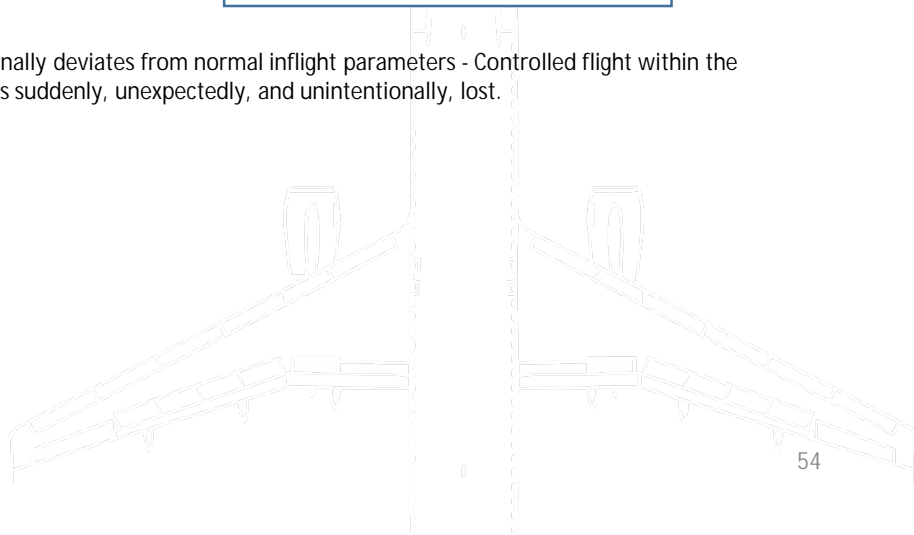
Definition: Air traffic and/or air navigation services are degraded or lost. This includes the ATS capacity (human/technical), capability (Human/Technical), infrastructure, and aircraft navigation systems both internal and external (dependant on external navigation data providers).



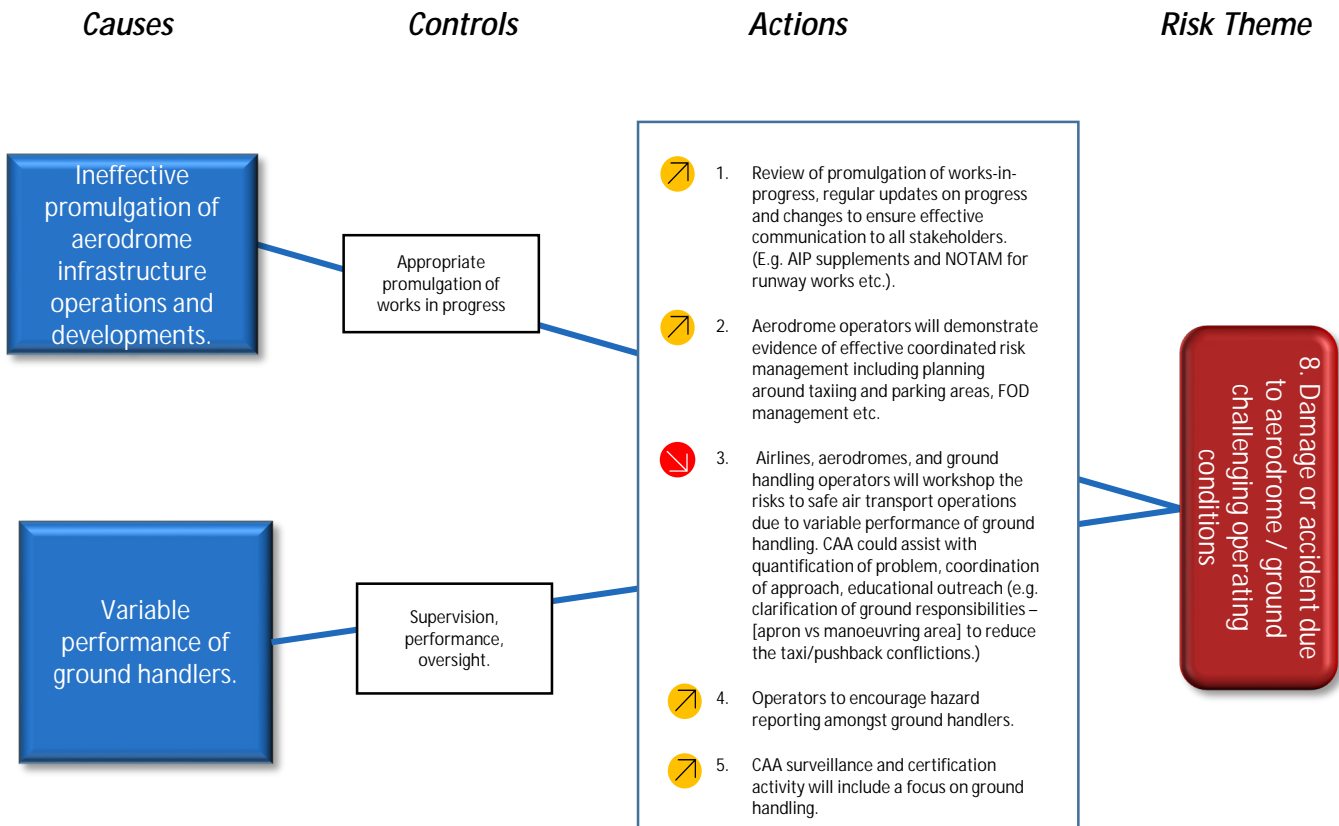
Risk 7 – Aircraft unintentionally deviates from normal inflight parameters (aircraft upset)



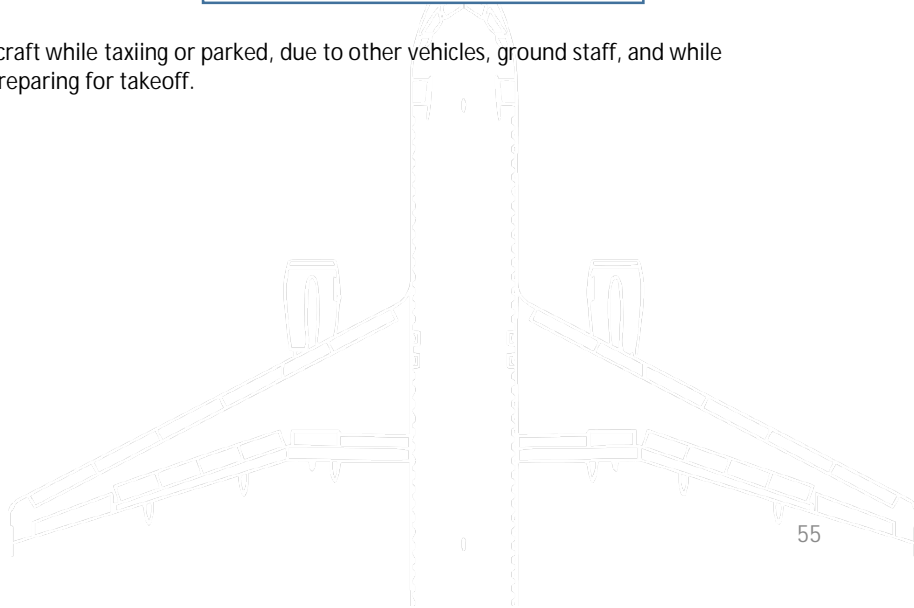
Definition: Aircraft unintentionally deviates from normal inflight parameters - Controlled flight within the bounds of the aircraft design is suddenly, unexpectedly, and unintentionally, lost.



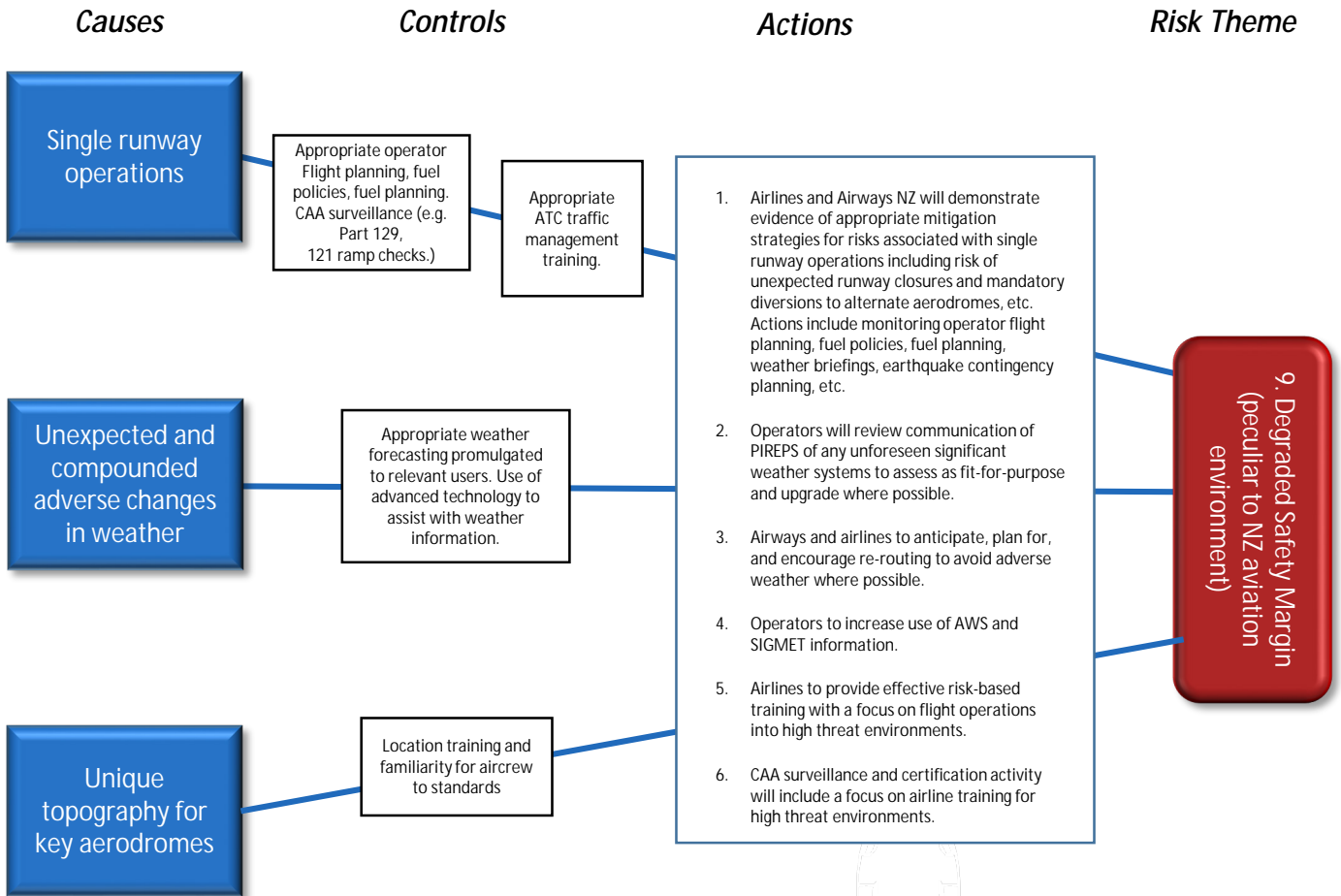
Risk 8 – Damage or accident due to aerodrome / ground challenging operating conditions



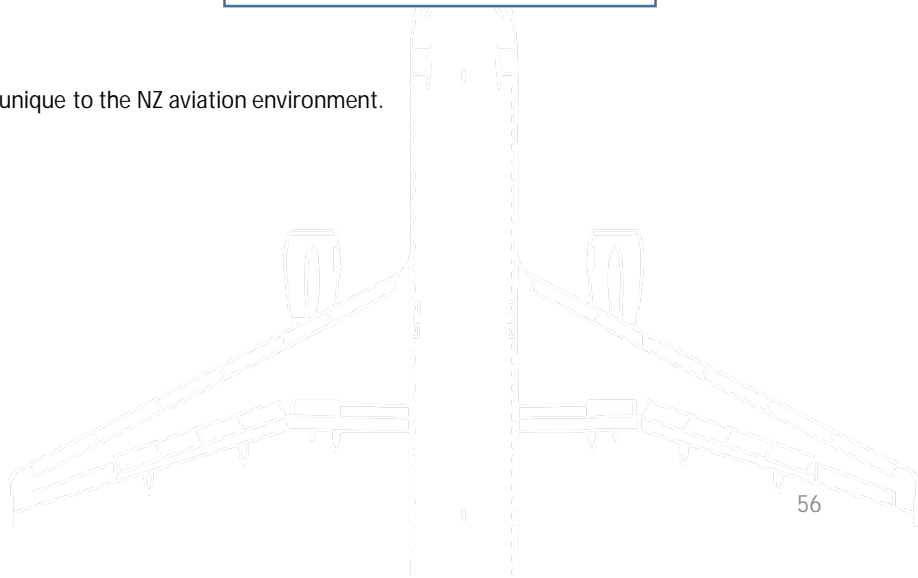
Definition: Damage to aircraft while taxiing or parked, due to other vehicles, ground staff, and while loading or unloading, or preparing for takeoff.



Risk 9 – Degraded safety margin (peculiar to NZ environment)



Definition: Factors unique to the NZ aviation environment.



Risk 10 – Compromise of safety to people on Aircraft

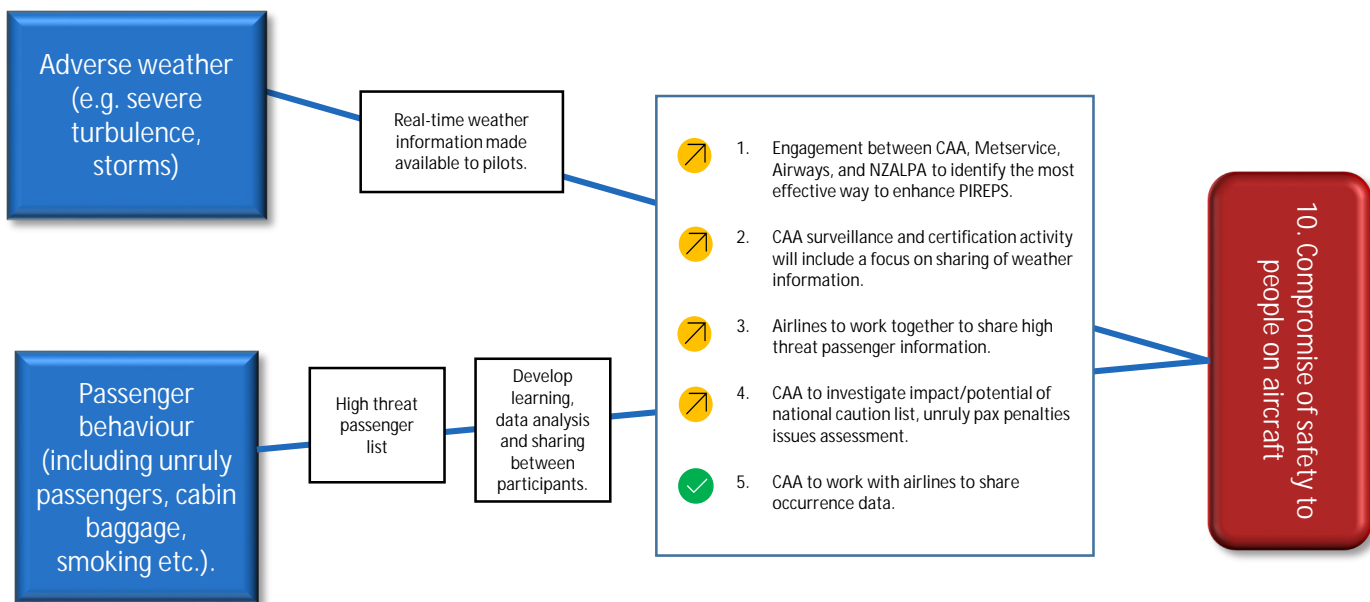


Causes

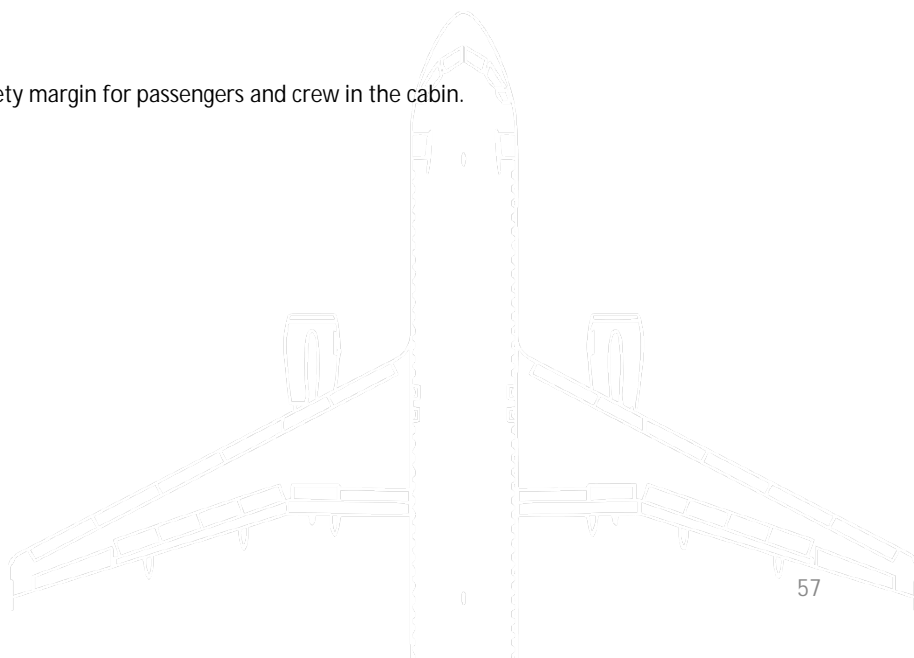
Controls

Actions

Risk Theme



Definition: Decreased safety margin for passengers and crew in the cabin.



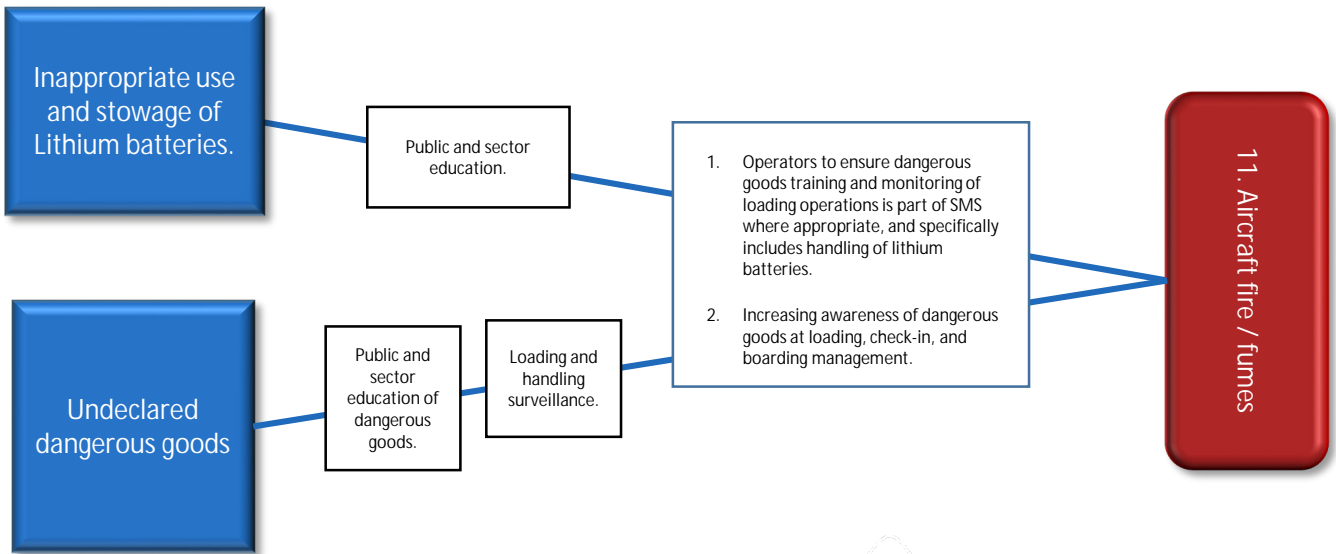
Risk 11 – Aircraft fire / fumes

Causes

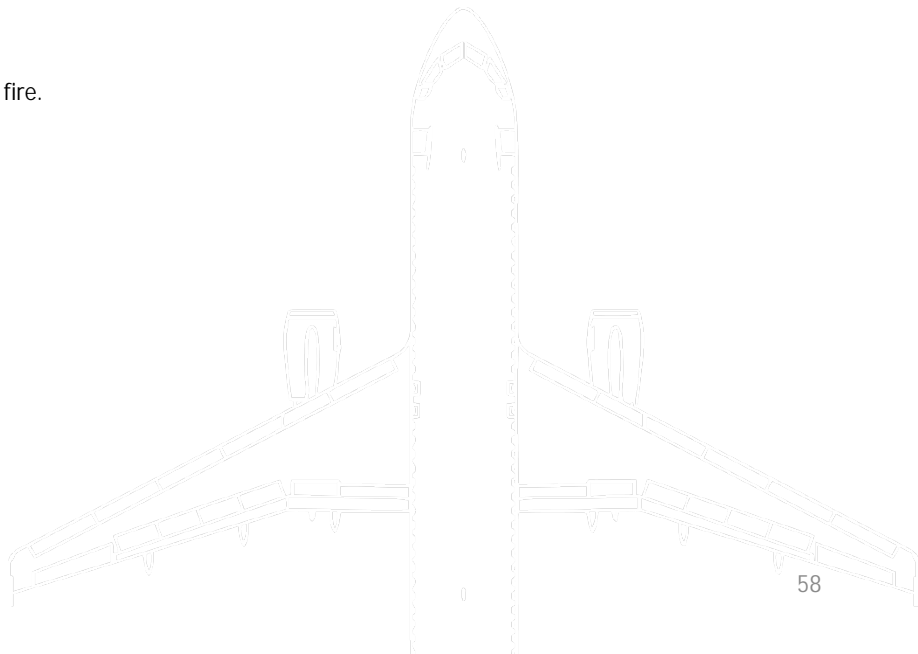
Controls

Actions

Risk Theme

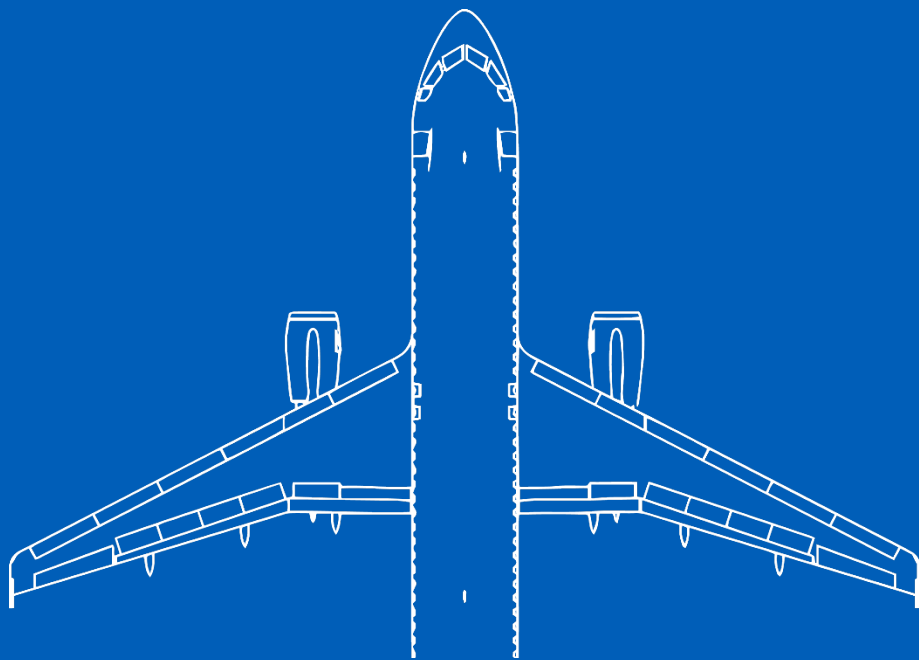


Definition: Inflight fire.



Appendix IV

Key next actions



APPENDIX IV – KEY NEXT ACTIONS

At the workshop held on 7 March 2019, participants identified a number of key actions that they believe need to be progressed against each of the five risks that they examined. These are summarised below.

Ref	Risk theme	Key actions identified
1	Runway excursions	1.1 Continue focus on training 1.2 Continue safety outreach and promotion 1.3 Monitor, measure and share safety information related to runway excursion risk
2	Runway incursions	2.1 Progress the broader fatigue policy work, to be conducted by CAA 2.2 Explore technology options such as runway overrun protection systems (ROPS) 2.3 Continue implementation of the National Runway Safety Group safety initiatives, including consideration for the mix of aircraft activity at aerodromes
3.	Airborne conflict	3.1 Leverage technologies (Transponder, ADS-B, TCAS, Non-cooperative surveillance etc.) which provide for conflict prevention and resolution 3.2 Enhance industry-wide education and outreach 3.3 Examine additional risk controls for 'uncontrolled airspace'
8	Damage to the aircraft while on the ground	8.1 Consider a national ground ops safety group (refer Australia, UK examples) 8.2 Establish a NOTAM manager position to prioritise/consolidate NOTAMs 8.3 Develop a training and competency assessment framework for airside workers 8.4 Enhance regulatory oversight and engagement regarding ground operations
10	Compromise of safety to people on aircraft in flight	10.1 Explore access to additional weather information products 10.2 Develop and articulate passenger behaviour expectations ('our house') 10.3 Develop better/faster process for unruly passenger information sharing

Participants are encouraged to adopt the above actions which are relevant to their operation. Specific initiatives related to each action will be determined during ongoing engagement between CAA and the Sector.

