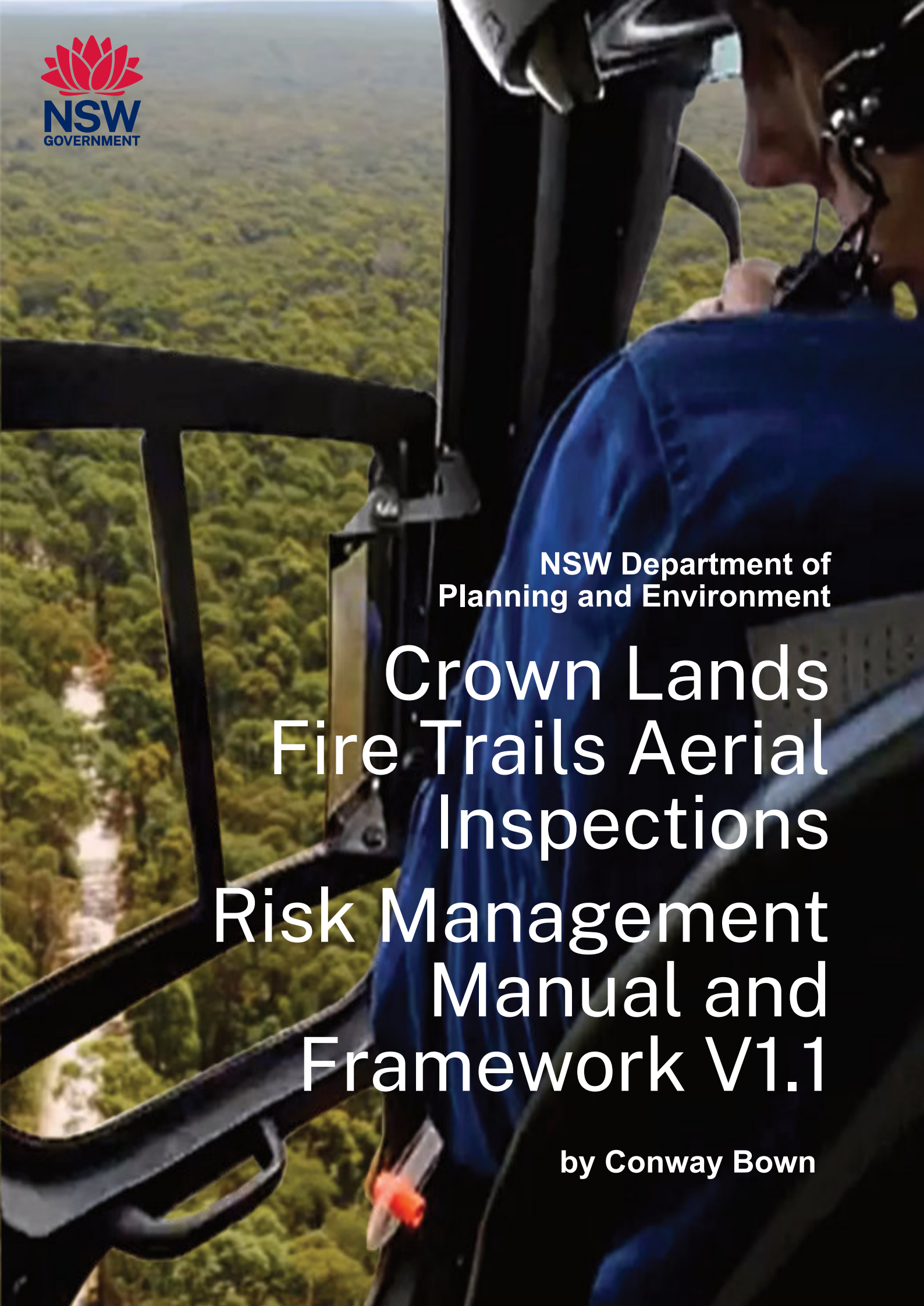

NSW GOVERNMENT

NSW Department of Planning and Environment

Crown Lands Fire Trails Aerial Inspections Risk Management Manual and Framework V1.1

by Conway Bown

Crown Lands Fire Trails Aerial Inspections

Risk Management Manual and Framework V1.1

by

Conway Bown
Independent Productions and Aviation Services

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Crown Lands Fire Trails Aerial Inspections Risk Management Manual and Framework V1.1

Contents

GLOSSARY

TERM	DEFINITION
accident	An occurrence involving an aircraft where: • a person dies or suffers serious injury • the aircraft is destroyed, or is seriously damaged • any property is destroyed or seriously damaged
ATSB	Australian Transport Safety Bureau.
BFCC	Bush Fire Coordinating Committee. A senior state-level committee that oversees and coordinates the BFMCs and which is chaired by the Commissioner of the NSW RFS.
BFMC	Bush Fire Management Committee. One of 57 committees raised within local areas that have representatives of key stakeholders concerned with the management of bush fire in their area.
bush fire / bushfire	A wildfire that occurs predominantly in bushland but which may include grass fires. Both spellings are acceptable.
CASA	Civil Aviation Safety Authority.
CASRs	Civil Aviation Safety Regulations.
communication and consultation	Continual or iterative processes that an organization conducts to provide, share or obtain information and to engage in dialogue with stakeholders regarding the management of risk. NOTE 3 Internal communication and consultation should be appropriately recorded.
consequence	Outcome of an event affecting objectives NOTE 1 An event can lead to a range of consequences. NOTE 2 A consequence can be certain or uncertain and can have positive or negative effects on objectives. NOTE 3 Consequences can be expressed qualitatively or quantitatively.
Crown land/s	Land or lands owned by the state of NSW and managed by the Crown Lands agency of DPE.
Crown Lands	An agency of the DPE charged with overseeing and managing land owned by the state of NSW.
dangerous incident	In relation to a workplace, an incident that exposes a worker to a serious risk to that person's health or safety, usually due to the uncontrolled release of a substance or a force or the interruption of ventilation in an enclosed area. See reference for details
DPE	Department of Planning and Environment.
DPIE	Department of Planning, Infrastructure and Environment (now called DPE)
event	An occurrence or change of a particular set of circumstances NOTE 1 Nature, likelihood, and consequence of an event cannot be fully knowable. NOTE 2 An event can be one or more occurrences, and can have several causes. NOTE 3 Likelihood associated with the event can be determined. NOTE 4 An event can consist of a non occurrence NOTE 5 An event with a consequence is sometimes referred to as “incident”. NOTE 6 An event where no loss occurs may also be referred to as a "near miss", "near hit", "close call" or "dangerous occurrence".

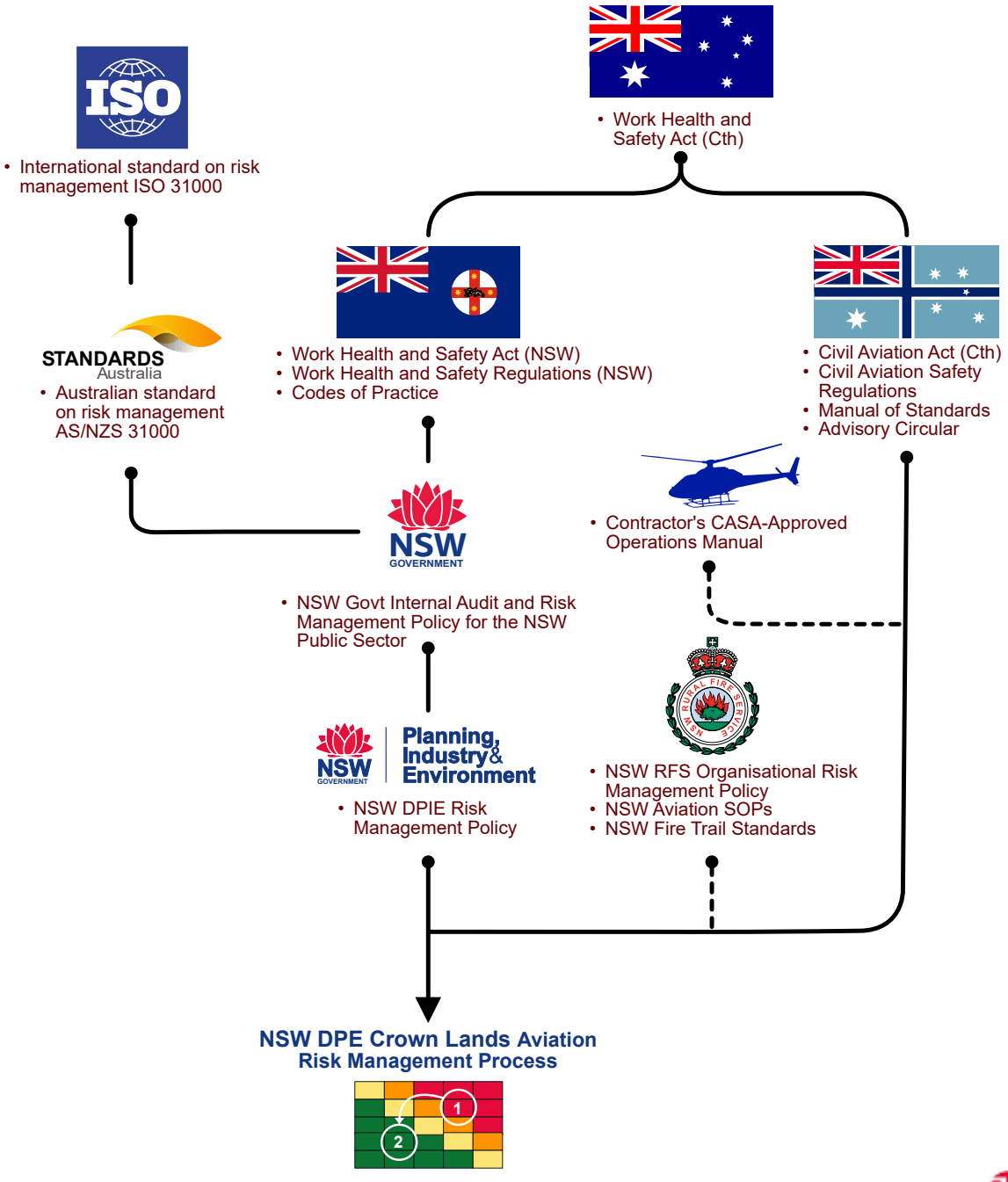
TERM	DEFINITION
exposure	the extent to which an organization is subject to an event
FAFT plans	Fire access and fire trails plans. Plans created by BFMCs for accessing bush land and other areas to fight fires and the maintenance of fire trails.
frequency	outcomes per defined unit of time
hazard	A potential source of harm (or risk)
incident	An occurrence, other than an accident or serious incident, associated with the operation of an aircraft that affects or could affect the safety of operation
ISO	The International Standards Organisation - an organisation with member states that aims to create best practice methods and standardisations for various activities across different industries
ISO 31000	The international standard for risk management in the form of guidelines as released by ISO
likelihood	The chance of something happening
MOS	Manual of standards. A publication that is produced to explain the CASRs by providing explanations and clarifications on the regulations.
NOTAM	Notice to Airmen. A notification of importance for aircrew to review prior to flight.
notifiable incident	the death, serious injury or illness of a person, or a dangerous incident.
occurrence	(in aviation reporting) an accident, incident or serious incident
person conducting a business or undertaking	An activity conducted by a person, either solely or with others for profit or not for profit. It does not necessarily include workers, an elected member of a local authority or a volunteer organisation.
probability	The measure of the chance of occurrence expressed as a number between 0 and 1, where 0 is impossibility and 1 is absolute certainty
reasonably practicable	When used in relation to duty to ensure health and safety, means that which is (or was at the time), reasonably able to be done when taking into account the likelihood of the hazard/risk, the degree of harm that might result, what the person knows or should have known about the hazard and risk and any mitigations, the availability of ways to eliminate or minimise risk and, after assessing all of the above, the cost to eliminate or minimse risk including whether the cost was grossly disproportionate to the risk.
residual risk	The risk remaining after risk treatments. NOTE 1 Residual risk can contain unidentified risk. NOTE 2 Residual risk is also known as retained risk.
review	An activity undertaken to determine the suitability, adequacy and effectiveness of the subject matter to achieve established objectives. NOTE Review can be applied to a risk management framework, risk management process or a risk.
risk	The effect of uncertainty on objectives. Objectives are contextual (eg financial, mission, profit) and risk is expressed as the consequences of an event and the likelihood of the occurrence.

TERM	DEFINITION
risk acceptance	The informed decision to take a particular risk. NOTE 1 Risk acceptance can occur without risk treatment or during the process of risk treatment. NOTE 2 Risk acceptance can also be a process. NOTE 3 Risks accepted are subject to monitoring and review.
risk assessment	Overall process of risk identification, risk analysis and risk evaluation.
risk criteria	The terms of reference against which the significance of a risk is evaluated NOTE 1 Risk criteria are based on internal and external context, and are regularly reviewed to ensure continued relevance. NOTE 2 Risk criteria can be derived from standards, laws and policies.
risk management	Coordinated activities to direct an organisation with regard to risk.
risk management plan	Document within the risk management framework specifying the approach, the management components and resources to be applied to the management of risk. NOTE 1 Management components typically include procedures, practices, assignment of responsibilities and sequence of activities. NOTE 2 The risk management plan can be applied to a particular product, process and project, and part or whole of the organization.
risk management process	The systematic application of management policies, procedures and practices to the tasks of communicating, consulting, establishing the context, identifying, analysing, evaluating, treating, monitoring and reviewing risk.
risk owner	A person or entity with the accountability and authority for managing the risk and any associated risk treatments.
risk profile	A description of a set of risks.
risk treatment	The process of developing, selecting and implementing controls. NOTE 1 Risk treatment can involve: — avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk; — seeking an opportunity by deciding to start or continue with an activity likely to create or enhance the risk; — removing the source of the risk; — changing the nature and magnitude of likelihood; — changing the consequences; — sharing the risk with another party or parties; and — retaining the risk by choice. NOTE 2 Risk treatments that deal with negative consequences are sometimes referred to as risk mitigation, risk elimination, risk prevention, risk reduction, risk repression & risk correction.
SAD	State Air Desk.
serious incident	An incident where an accident nearly occurred.
serious injury	An injury that requires, or would usually require, admission to hospital within seven days after the day when the injury was suffered.
SMEACS	A briefing and planning method based on the military 5 paragraph order. Situation, Mission, Execution, Administration, Command, Safety
stakeholder	Any person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or activity.
worker	A person carrying out work in any capacity for a person conducting a business or undertaking.
workplace	A place where work is carried out and can include a vehicle, aircraft, vessel or installation.

Crown Lands Risk Management

Contributing resources

The DPE Crown Lands' aviation risk management process is derived from various standards and policies along with inputs from the requirements of key stakeholders. The diagram below provides context on the contributing resources and their parent/child relationships. The final result is the risk management process.



Part 0: Introduction

Section 0.1 : Background and references

0.1 Background. The Department of Planning and Environment (DPE) is tasked, *inter alia*, with "working with the community, business and government to care for and protect NSW's environment and energy resources."[1] Part of this responsibility is the assessment and oversight of the status and maintenance of fire trails that are located on Crown land. The Crown Lands agency of the department requested that Independent Productions and Aviation Services (IPAS) assist it with creating a risk management process that will enable DPE to actively involve its personnel in understanding and utilising appropriate risk management procedures for aerial inspections of fire trails by helicopter. A review of processes and interviews with key management determined that while the organisation was adhering to the precepts of effective risk management by its planning and training methodologies, this did not necessarily filter down to the operators who were tasked with carrying out their duties in the field, nor were the processes that were to be used widely understood and applied. This was identified as a hazard to safety, efficiency and hindered adherence to legislated processes.

Conducting aerial inspections of fire trails requires good crew coordination and airmanship to ensure safety. Image: Peter Bakema (GFDL 1.2), via Wikimedia Commons

0.2 This risk management process. As part of the request for service, IPAS has reviewed current policies, guidelines and best practices in order to create a risk management process that achieves the intent of adhering, as far as possible, to legislation, policies and guidelines while making it simple to use by operators.

0.3 This publication's aims. This risk management publication is:

a. a consolidated set of risk management procedures that:

i. are easy-to-understand and easy-to-carry out as a risk management process nested within a risk management plan that is required by state government risk management policy

ii. provide a new team member or a person from outside Crown Lands an in-depth understanding of the tasks and activities and associated risks that are covered by this publication.

b. a set of risk management procedures that adhere to the requirements and recommendations of the following legislated policies, procedures, references and source documents:

i. *Work Health and Safety Act 2011 No 137 (Commonwealth)*

ii. *Work Health and Safety Act 2011 No 10 (NSW)*

iii. *Civil Aviation Act 1988*

iv. *Civil Aviation Safety Regulations 1998*

v. *NSW Treasury Internal Audit and Risk Management Policy for the NSW Public Sector - Policy and Guidelines Paper TPP 15-03*

vi. ISO 31000:201 / *AS/NZS 31000: Risk Management*

vii. *NSW Rural Fire Service Organisational Risk Management Framework v4.0*

viii. *NSW Rural Fire Service P7.1.10-Organisational-Risk-Management-v2.2*

ix. *TPP 12-03b Risk Management Toolkit for NSW Public Sector Agencies*

x. NSW Aviation Standard Operating Procedures

xi. NSW Department of Primary Industries Task Risk Assessment Aerial Surveillance

xii. Civil Aviation Safety Authority Advisory Circulars

xiii. Australian Transport Safety Bureau statistics

xiv. Bureau of Infrastructure and Transport Research Economics statistics

xv. Royal Commission into the 2019/2020 Bush Fire Disaster

xvi. Other source references listed in each section's endnotes

xvii. Interviews with stakeholders within DPE

xviii. Interviews with contracted support organisations.understanding of the tasks and activities and associated risks that are covered by this publication.

DISCLAIMER: This document is a guide on the process to be applied, as directed by authorised persons within the Department, to undertake risk assessments for aerial inspection operations. It makes reference to legislation, guidelines, procedures and data and other information but IS NOT LEGISLATION.

The mandatory requirements to comply with processes and procedures are laid out in Commonwealth and State laws and policies.

The reader is encouraged to make him or herself familiar with the Acts and policies applicable to his/her roles and responsibilities. The references in this document provide guidance on those acts and policies that may be applicable and the reader is directed to refer to the source documents — and their current versions — for the most up-to-date information.

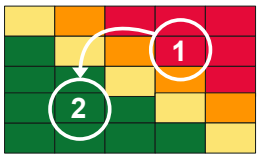
If any discrepencies arise when reading this document, the relevant Act or policy takes precedence and should be used as the primary reference.

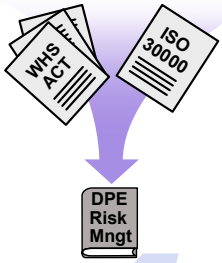
Crown Lands Risk Management

What is this book and this process all about?

Risk is the effect on **uncertainty** on objectives.
It is a neutral term, neither positive nor negative.

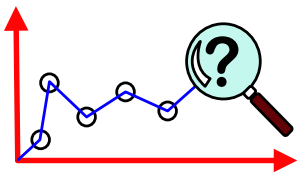
Risk management describes the activities that are used to **direct and control** an organisation with regard to risk.





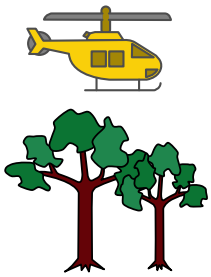
This document uses ISO and other reference materials and **adapts and integrates** processes to **meet the needs of the organisation**, its activities, personnel and management.

This process adheres as closely as possible to those recommended by ISO and used by other NSW Govt agencies, and remains within Commonwealth legislative requirement for WHS and aviation.



Information in this process is derived from statistical data, Standards Australia, national aviation authorities and other risk management organisations.

Also integrated into this process is information from the organisation, from contracted service suppliers and allied organisations that undertake similar roles to create a user manual.



Part 1: What is Risk Management

Section 1.1: Definitions

1.1.1 Defining risk. Risk is the effect of uncertainty on objectives. It is non-pejorative, which means that risk can be either positive or negative.[1] It can be described using various parameters and conditions, such as:

a. risk sources (such as hazards, culture, environmental conditions etc)

b. events that may occur

c. consequences of an event occurring

d. likelihood of an event occurring or the exposure to the conditions that would allow an event to occur

e. controls that may eliminate or mitigate risk.

> **Risk management describes the activities that are used to direct and control an organisation with regard to risk.**
>
> **-ISO**

Risk can therefore be summarised as the consequence of an organisation undertaking its activities in pursuit of its objectives within an environment of uncertainty where the uncertainties are born from factors that are internal and external to the organisation and not necessarily under its control.[2]

1.1.2. What is risk management? Risk management describes the activities that are used to direct and control an organisation with regard to risk.[3] It includes:

a. Risk Management Framework - the foundations and organisational arrangements to create, use and improve risk management processes [4]

b. Risk Management Policy - a statement by an organisation as to how it intends to direct its activities in relation to managing risk[5]

c. Risk Management Plan - the scheme within a risk management framework that provides the manner, the components and the resources that are to be applied in order to manage risk.[6]

1.1.3. International standards in risk management. The International Standards Organisation (ISO) provides guidelines on the best practice for creating risk management policies and procedures.

1.1.4. This document's purpose. This document uses ISO and other reference materials and adapts and integrates processes to meet the needs of the organisation, its activities, personnel and management. In particular, it aims to create a methodology for a risk management plan that includes procedures, practices, the assignment of responsibilities and sequencing and timing of activities related to mission risks including

the operational risks related to the aerial inspection of fire trails.

1.1.5. The processes outlined herein. The processes described in this document which can be used by the department's personnel for aerial inspection operations adheres, as closely as possible, to those processes used by other NSW Government agencies doing similar roles. It is designed to align itself as closely as possible to the ISO standard as well as standard practices used in aviation operations and their operating procedures while remaining within Commonwealth and state legislation with regard to workplace health and safety and aviation regulations.

1.1.6. Data sources and references. This document compares data and processes from other organisations such as the Australian Transport Safety Bureau, Bureau of Infrastructure and Transport Research Economics, Standards Australia/Standards New Zealand, British Standards, national aviation authorities, and others. Where it pertains to operational matters, data and references from aviation regulators, other aviation users performing similar roles, and service providers are used to ensure conformity with legislations, regulations, SOPs and approved operations. This includes such organisations as CASA, NSW RFS, NSW DPI, aviation contractors and others.

1.1.7. An analysis of the organisation's tasks and activities and advice from members from within the organisation, contractors and allied organisations undertaking similar roles have been integrated into the processes.

Image by Wokandapix from Pixabay CC-0

Pilot flying during Mission Crew training
Image by Conway Bown

Crown Lands Risk Management

The nine principles of risk management

The nine principles of risk management. The international standard on risk management—ISO 31000—provides organisations with guidance on what is considered best practice in the area of risk management and what its guiding principles should be, as shown in the image below. Central to all is the protection of resources (including human resources) and the adding of value to an organisation. - *Image by author derived from ISO 31000*

Section 1.2: Why concern ourselves with risk management?

1.2.1 Create and protect value. The fundamental reason to undertake risk management is to create and protect value. That value may be human life and health, assets, capabilities, reputation, money, time, customers and clients, or anything else considered to be of value. Based on this fundamental reason are a number of principles of risk management which have been rationalised from eleven to nine as the ISO guidelines have matured over the course of a decade.[1] These are discussed below.

1.2.2. Statutory and regulatory requirements. Nothwithstanding the principles of risk management, there are statutory and regulatory requirements to ensure workplace safety for all persons that must be adhered to by all Australian employees and persons conducting a business or undertaking as directed by the Workplace Health and Safety Act,[2] and specifically by employees of the New South Wales government as directed by auditing and risk management policy.[3]

1.2.3 Effective management. understands the importance of risk management for the above reasons which, in sum, are:

a. To create and protect value, particularly personnel

b. To create and protect value, including tangible assets and financial assets

c To enhance efficiency in operations and supporting the successful achievement of objectives

d. To manage risk by enhancing the likelihood of positive outcomes and mitigating the likelihood of negative outcomes

c. To support senior management's roles and responsibilities with regard to policy.

The nine principles of risk management

1.2.4 ISO 31000's nine principles of risk management. The current nine principles of risk management, as shown in Figure 1.2.1, are:

- the creation and protection of value
- the integration of risk management throughout the organisation's activities
- a continual improvement in the organisation's activities, including risk management
- using the best available information to improve and enhance risk management, organisational activities and decision-making
- a structured and comprehensive approach to risk management
- an inclusive system that involves all stakeholders and their knowledge, views and perceptions
- a system that is customised and tailored to an organisation's needs
- a system that is dynamic and reactive to new threats and events and proactive to

likely future threats and events as an iterative process that can be upgraded and amended depending on changing circumstances

- being aware of human and cultural factors that may have an impact on risk management.[4]

Yengo National Park after the 2019/2020 bushfires
Image by 'olderthangoogle' CC 4.0 BY-SA

Endnotes - Chapter 1

Section 1.1

1. International Standards Organisation, ISO/IEC Guide 73:2009 *Risk Management Vocabulary*, Geneva, p1-2
2. Paraphrased from Purdy, G, 'ISO 31000:2009—Setting a New Standard for Risk Management, Society for Risk Analysis, *Risk Analysis Vol 30, No 6, 2010*, DOI: 10.1111/j.1539-6924.2010.01442.x. 2010, p 882
3. International Standards Organisation, Guide 73:2009, *Risk Management Vocabulary*, Geneva, para 3.2
4. International Standards Organisation, Guide 73:2009, *Risk Management Vocabulary*, Geneva, para 3.2.1
5. International Standards Organisation, Guide 73:2009, *Risk Management Vocabulary*, Geneva, para 3.2.2
6. International Standards Organisation, Guide 73:2009, *Risk Management Vocabulary*, Geneva, para 3.2.3

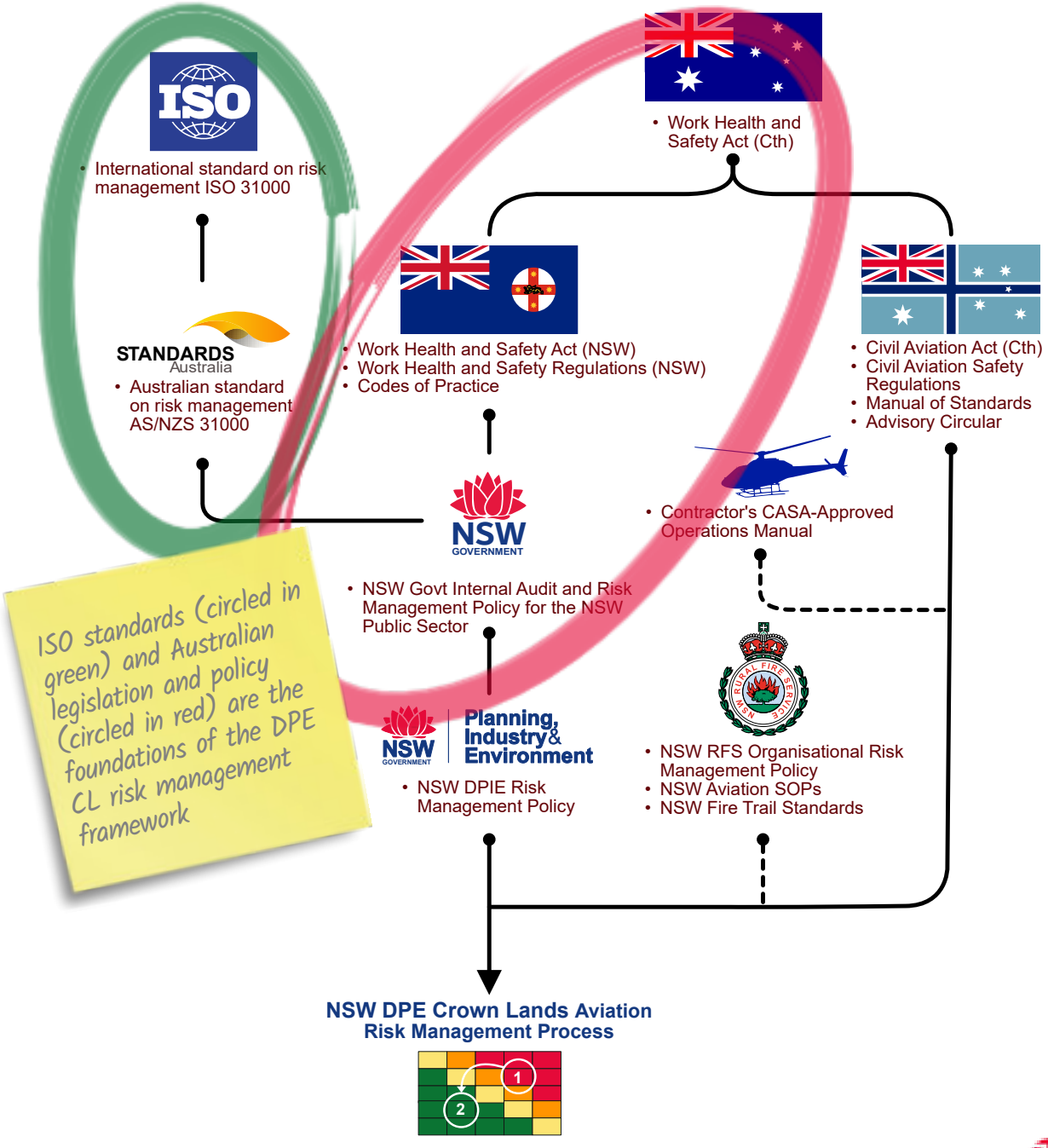
Section 1.2

1. International Standards Organisation, ISO 31000:2018 *Risk Management - Guidelines* s.4 as compared with ISO 31000:2009 s.3
2. Workplace Health and Safety Act 2011 (C'th), S.27 and S.28
3. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector,* Sydney, 2020, p. i
4. International Standards Organisation, ISO 31000:2018 *Risk Management - Guidelines*, ISO, Geneva, 2018, p. 4

Crown Lands Risk Management

Contributing resources

The DPE Crown Lands' aviation risk management process is derived from various standards and policies along with inputs from the requirements of key stakeholders. The diagram below provides context on the contributing resources and their parent/child relationships. The final result is the risk management process.



Part 2: Legal, Moral & Technical Responsibilities

Section 2.1: Statutory responsibilities of governments and agencies under Australian law

2.1.0 Overarching documents. The illustration at left shows the key overarching documents from which most other contributing sources refer: the ISO and Australian standard on risk management (ISO 31000/AS/NZS 31000), the Commonwealth *Work Health and Safety Act* and the NSW *Work Health and Safety Act*. Below are some of the responsibilities from these documents.

2.1.1 Duties of officers. The *Work Health and Safety Act 2011 (C'th) No 137* devotes a significant section to the duties and responsibilities of those conducting a business or undertaking, and those working in a business or an undertaking. Specifically, it says that it is the duty of an officer[1] to:

- ensure that the person conducting the business complies with his or her responsibilities under the Act
- acquire and keep up-to-date knowledge of work health and safety matters
- to gain an understanding of the nature of operations and, generally, of the hazards and risks associated with those operations
- that appropriate resources are available to eliminate or minimise risks to health and safety from work carried out as part of the business or undertaking
- to ensure appropriate information is received and considered about the hazards and risks in a timely way
- to ensure that the person undertaking the business or undertaking has, and implements, processes for complying with his/her duties under the Act, and
- to verify the provision and use of resources and processes which includes training and instruction[2]
- to consult with workers any matter relating to work health and safety[3] and to do so when identifying hazards and assessing risks related to work and making decisions about ways to eliminate or minimise those risks.[4]

Duties are not transferable[5] and a person can have more than one duty[6] by virtue of being in two or more classes of duty holder (eg worker and manager at the same time).

2.1.2 Duties of workers. Similarly, a worker[7] has responsibilities also. A worker has a duty to:

- take reasonable care for his/her own health and safety
- take reasonable care that his/her acts or omissions do not adversely affect other people
- comply, when reasonably able, with any reasonable instruction by the person conducting the business or undertaking to comply with the Act

- comply with any reasonable policy related to health and safety at the workplace[8]

A workplace is a place where work is carried out in the common sense, but can include a vehicle, aircraft, vessel or installation.[9]

2.1.3 Duties with regard to risk. The *Workplace Health and Safety Act 2011 (C'th)* is specific about the management of risk, stating that it is the duty of a person who is required to ensure health and safety to:

- eliminate risks to health and safety, so far as is reasonably practicable

- if it is not reasonably practicable to eliminate risks to health and safety, then to minimise those risks so far as is reasonably practicable.[10] (This is discussed in the next section).

2.1.4 Duties with regard to consultation. When workplace risk and hazards and their controls are being assessed and controlled, it is necessary to ensure consultation occurs up and down the management chain, and between workers. The duties to consult include such responsibilities as:

- consult with other duty holders if the other duty holders have a responsibility in regards to the same matter and must, so far as is reasonably practicable, consult, cooperate and coordinate activities with all other persons who have a duty in relation to the same matter [11]

- giving workers a reasonable opportunity to express views and raise work health and safety issues and to contribute to the decision-making process.[12]

> **A workplace is a place where work is carried out in the common sense, but can include a vehicle, aircraft, vessel or installation**
>
> **-WHS Act**

2.1.5 Offences. It is an offence under the Act if a person, who has a duty under the Act as described above, engages in reckless conduct such that it exposes another person to risk of death or serious injury or illness without a reasonable excuse.[13] Likewise, it is also an offence if a person fails to comply with a duty[14] and it exposes others to risk of harm, regardless of whether it results in injury or illness.[15]

Responsibilities under State Laws and Government Policy

2.1.6 State WHS legislation. The *Work Health and Safety Act 2011 No 10 (NSW)* is the NSW interpretation of the Commonwealth legislation as it applies within NSW. For the most part, it is harmonised as closely as possible to the Commonwealth Act with the exceptions pertaining to police and emergency services that are state-based and the use of the Australian Defence Force and other Commonwealth responsibilities such as territorial jurisdictions, maritime law and other differences between the Commonwealth and the States. These differences are not relevant to the guidelines within this document.

NSW Government Policy for the Public Service

2.1.7 Public sector policy. While state WHS laws are aligned with Commonwealth laws and can be considered, in a general sense and thus be made applicable for all residents of NSW, there are specific requirements on departments and agencies that

work for the NSW Government. NSW Public Sector policy requires department heads, agencies, and officers of an authority and accounting officers to adhere to its principles. These principles include instigating a risk management framework to manage risk and to facilitate internal auditing functions and to ensure compliance with the Core Requirements of the Policy to which the Accountable Authority (eg Agency head) must attest to NSW Treasury and print in the agency's annual report.[16]

2.1.8 Internal audit and risk management policy. A review of of the NSW public sector in 2007 provided key recommendations on how best to strengthen 'whole of government' policy and regulatory framework. One of the key recommendations was the introduction of 'best practice' risk management to facilitate internal auditing.[17] Two years later, the NSW Treasurer's Direction incorporated this recommendation in the *Internal Audit and Risk Management Policy for the NSW Public Sector.*[18] This document was later replaced by the *Internal Audit and Risk Management Policy for the General Government Sector 2020*, however the precepts remain the same.

2.1.9 Principles of the Policy. While the original intent of risk management was to ensure financial integrity and auditing, it has expanded across agencies and departments to incorporate all business activities. The principles, in sum, are:

- Agencies have a risk management framework in place that supports the achievement of objectives by systematically identifying and managing risks to increase the likelihood of positive events and reduce the likelihood of negative events

- Agencies have an internal audit function that provides information to management about internal control systems and compliance; whether results are as expected; and whether operations and programs are being carried out as planned

- Agency heads receive relevant and timely advice on agency governance, risk and control frameworks and its external accountability obligations from a independent review committee.[19]

2.1.10 In other words, a risk management program that increases the likelihood of achieving agency objectives and that provides assurances to management and auditors that it is working as planned and is compliant with policy.

2.1.11 To whom does this apply? The policy of *Internal Audit and Risk Management* has been issued as a 'direction' and applies to all agencies listed in Schedules 2 and 3 of the Government Sector Finance Regulations 2018 which are replicated in Annexure J of TPP 20-08 which includes DPE.[20]

Crown Lands Risk Management

NSW Government clustered departments

CLUSTER	RESPONSIBLE DEPARTMENT	AGENCIES, CORPORATIONS (& Services)
Premier & Cabinet	Dept of Premier & Cabinet	16 Agencies
Treasury	Dept of Treasury	1 Agency
Customer Service	Dept of Customer Service	5 Agencies
Planning & Environment	**Dept of Planning and Environment**	3 Agencies 5 Corporations **NSW PWS** **Crown Lands**
Transport	Dept of Transport	1 Corporation
Health	Ministry of Health	3 Agencies
Education	Dept of Education	2 Agencies
Stronger Communities	Dept of Communities and Justice	13 Agencies including **NSW RFS**
Regional NSW	Dept of Regional NSW	2 Agencies, namely **Local Land Services** **Forestry Corporation**

Source: NSW Govt Website 2021

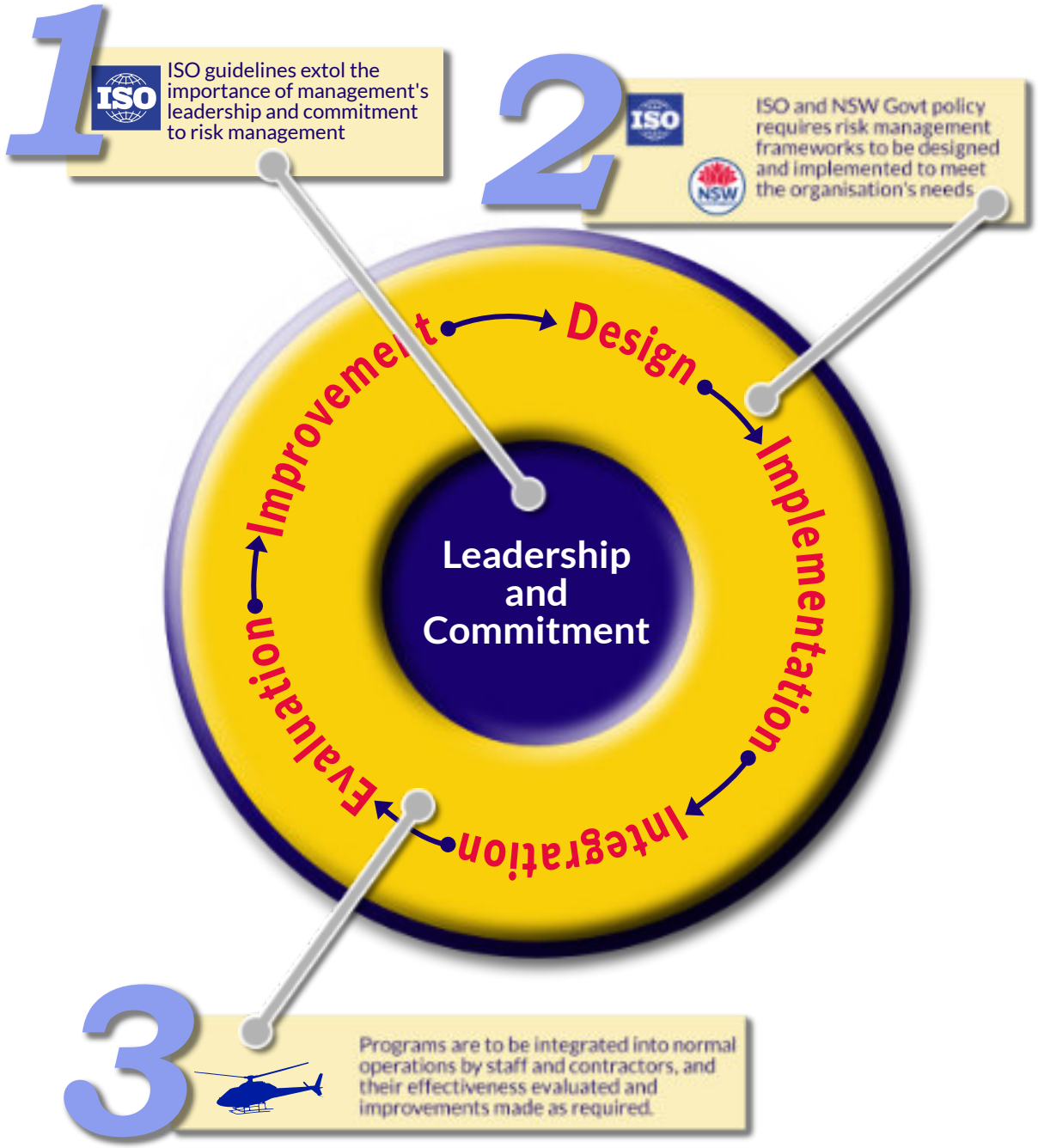
2.1.12 Application within the Department of Planning and Environment. All members of the Department of Planning and Environment have been directed by departmental risk management policy to ensure that they adhere to risk management requirements and have the resources, tools and procedures to undertake their role in relation to risk management.[21]

The graphic below provides the most recent structure of the NSW Government as at time of writing. The various departments and agencies often change names and areas of responsibilities, but the concept of risk management still applies regardless of the nomenclature and the responsibilities of agencies and department heads remain extant.

2.1.12 When does this apply? Department heads[22] and statutory bodies[23] must include relevant information as mentioned above as part of their annual reports or by means of a separate report. In any case, an attestation statement must be made in the report and a copy supplied to Treasury on or before 31 October each year. An attestation statement is a statement that affirms the agency's compliance with the core requirements of the Internal Audit and Risk Management policy.[24]

Crown Lands Risk Management

Risk management design and responsibilities



Section 2.2: Responsibilities of management, staff and contractors

2.2.1 Management's role. The role of management is to effectively manage, plan, oversee, execute and review operations in order to achieve organisational goals. It must do this in the most efficient and safe way while also being as economical as possible. Risk management requires risk to be eliminated, or if it cannot be eliminated, then the effects of risk must be mitigated so far as is reasonably practical.[1]

2.2.2 So Far As is Reasonably Practicable (SFARP). SFARP is interpreted to mean that which is able to be done to ensure health and safety when taking into account:

- the likelihood of the hazard/risk occurring
- what the person knows or ought reasonably to know about
    - the hazard or risk
    - the ways to eliminate or minimise risk
- the availability and suitability of ways to eliminate or minimise risk
- after the above are satisfied, assessing the relative cost associated with eliminating or minimising risk and whether the cost is grossly disproportionate to the risk.[2]

2.2.3 ISO's view on management's responsibility. ISO 31000 is specific in its view of the responsibility of management when it comes to risk. It states:

> *The purpose of the risk management framework is to assist the organization in integrating risk management into significant activities and functions. The effectiveness of risk management will depend on its integration into the governance of the organization, including decision-making. This requires support from stakeholders, particularly top management.*
>
> *Framework development encompasses integrating, designing, implementing, evaluating and improving risk management across the organization. The image at left illustrates the components of a framework.*
>
> *The organization should evaluate its existing risk management practices and processes, evaluate any gaps and address those gaps within the framework.*
>
> *The components of the framework and the way in which they work together should be customized to the needs of the organization.*[3]

2.2.4 NSW Government policy on management's responsibility. NSW Public Sector risk management policy stipulates that not only agency heads must ensure that risk management frameworks are consistent with ISO standards, they must also be tailored for their organisation's needs.[4]

2.2.5 DPE policy on risk management. The department has an enterprise-wide risk management framework across its business and the related government agencies. The department is committed to provide a consistent and systematic process to manage risk across the organisation.[5] DPE, in its former iteration as the Department of Planning, Industry and Environment (DPIE), created a risk management policy that applies to all

departmental operations and to all departmental staff, consultants and contractors of all entities within the DPE cluster.[6]

2.2.6 DPE risk management policy highlights. As per the Department's 2019-20 Annual Report, the department issued a revised risk management policy in June 2020 that applies across the entire department.[7] The department's policy is quite specific on the responsibilities of its members and contractors when it comes to risk management, such as the following:[8]

- integrate risk management processes into strategic, business and program planning activities
- ensure that risks that could significantly impact the Department, life and property are assessed, monitored and treated
- identify all key compliance obligations such as relevant laws, regulations and policy and where required, risk ratings and risk treatment plans through the risk management process
- ensure staff have the necessary tools, resources and procedures to undertake their role in relation to risk management
- develop and maintain risk registers to capture risks, related controls, treatment plans and accountabilities
- develop and maintain standard risk criteria to provide a consistent basis for assessing and managing risk
- promote and support the understanding of risk management and effective risk management culture at all levels so that risks can be managed within the department's risk appetite
- identify clear ownership or risks so they may be managed
- maintain relevant and accurate information about risks, losses and treatments to allow for accurate analysis and reporting.

2.2.7 DPE compliance with NSW Government risk management policy. The DPE endeavours to ensure that its internal risk management frameworks are compliant with NSW Government risk managment policy. The DPIE Annual Report 2019-20 reported the following to the Department of Treasury about the core requirements of the state government policy:[9]

- *1.1 The agency head is ultimately responsible and accountable for risk management in the agency: Compliant*
- *1.2 A risk management framework that is appropriate to the agency has been established and maintained and the framework is consistent with AS/NZS ISO 31000:2009: Compliant*

Internal Audit Function

- *2.1 An internal audit function has been established and maintained: Compliant*
- *2.2 The operation of the internal audit function is consistent with the International Standards for the Professional Practice of Internal Auditing: Compliant*
- *2.3 The agency has an Internal Audit Charter that is consistent with the content of the 'model charter': Compliant*

Audit and Risk Committee

- *3.1 An independent Audit and Risk Committee with appropriate expertise has been established: Compliant*

- *3.2 The Audit and Risk Committee is an advisory committee providing assistance to the agency head on the agency's governance processes, risk management and control frameworks, and its external accountability obligations: Compliant*

- *3.3 The Audit and Risk Committee has a Charter that is consistent with the content of the 'model charter': Compliant*

2.2.8 Core Requirements of the Internal Audit and Risk Management Policy. The previous paragraph related how the DPIE Annual Report stated that the department was compliant with the principles of the policy. Since that report was written the policy was updated. The new core requirements fall into three key principles, and are as follows:[10]

- **Principle 1**

Effective risk management arrangements should support the agency in achieving its objectives by systematically identifying and managing risks.

- **Core Requirement 1.1**

The Accountable Authority shall accept ultimate responsibility and accountability for risk management in the agency.

- **Core Requirement 1.2**

The Accountable Authority shall establish and maintain a risk management framework that is appropriate for the agency. The Accountable Authority shall ensure the framework is consistent with *AS ISO 31000:2018*.

- **Principle 2**

An internal audit function should provide timely and useful information to management.

- **Core Requirement 2.1**

The Accountable Authority shall establish and maintain an internal audit function that is appropriate for the agency and fit for purpose.

- **Core Requirement 2.2**

The Accountable Authority shall ensure that the operation of the internal audit function is consistent with the International Standards for Professional Practice for Internal Auditing.

- **Core Requirement 2.3**

The Accountable Authority shall ensure the agency has an Internal Audit Charter that is consistent with the content of the 'model charter'

- **Principle 3**

An independent Audit and Risk Committee with appropriate expertise should provide relevant and timely advice to the Accountable Authority on the agency's governance, risk and control frameworks and its external accountability obligations.

- **Core Requirement 3.1**

The Accountable Authority shall establish and maintain efficient and effective arrangements for independent Audit and Risk Committee oversight to provide advice and guidance to the Accountable Authority on the agency's governance processes, risk management and control frameworks, and its external accountability obligations.

- **Core Requirement 3.2**

The Accountable Authority shall ensure the Audit and Risk Committee has a Charter that is consistent with the content of the 'model charter'

2.2.9 The Department's risk owners. Throughout DPE are a number of risk owners with varying levels of responsibility. In summary they are as follows:[11]

a. **Secretary** - The Secretary has the responsibility and accountability for risk management across the department. S/he provides leadership and support for effective risk management and approves the department's risk management policy and procedures. S/he is also responsible for ensuring that policy and procedures are communicated, implemented and kept current. S/he has the further responsibility, in accordance with ISO guidelines, for ensuring and promoting a positive risk culture. S/he decides and communicates the level of risk the department is willing to accept or tolerate.

b. **Direct reports to the Secretary** - those members of the department that report directly to the Secretary are responsible for supporting the Secretary in the effective management of risk and the promotion of a positive risk culture within the department. The persons who report directly to the Secretary are also charged with ensuring that the group's business plans and performance monitoring all include risk analyses to support the achievement of departmental outcomes. They are also responsible for providing the appropriate amount of resources for the implementation of the departmental risk management policy.

c. **Deputy Secretary Crown Lands** - The DepSec Crown Lands is responsible for establishing risk management frameworks and programs and conducting reviews. S/he also agrees to the policies that manage each of these risks. Risk management policies are established to manage risks faced by the Land Administration Ministerial Corporation (LAMC). S/he also sets risk limits and controls to monitor risks. Compliance with policies is reviewed by the LAMC on a regular basis.[12]

d. **Audit Risk Committee** - The audit risk committee's role is to review the risk management framework put in place by management and to ensure that it is current. Other tasks include those responsibilities as outlined in the Audit Risk Committee charter. The Audit and Risk Committee gives the Secretary independent advice. It does so by monitoring, reviewing and providing advice about the department's governance processes, risk management and control frameworks, and external accountability obligations.[13]

e. **General Counsel** - The General Counsel is the executive sponsor for risk management in DPIE (now DPE). S/he provides expert and authoritative advice and contributes to decision making. The Deputy General Counsel's roles include identifying emerging issues and risks and their implications and to propose solutions.

f. **Deputy Secretary/Executive Director/Director/Program Owner** - These roles represent senior management at various hierarchical vertical levels within the department. Their roles are to implement the department's risk management policy in their directorate/ division / branch / program. They are also accountable for managing their directorate / division / branch / program risks and maintaining effective internal controls and managing treatment plans. Furthermore, they are to ensure appropriate resources are assigned to manage risks effectively and that risk information and risk register quality is maintained to an acceptable standard.

g. **Executive Director, Governance** - The Executive Director for governance has overall responsibility for resourcing the department's risk management framework. S/he is accountable for ensuring that it has been designed appropriately and that it is fit for purpose. S/he reports directly to the Secretary, the Audit and Risk Committee and other senior executives or risk frameworks and their controls and treatment plans.

h. **Chief Risk Officer** - The Chief Risk Officer designs the department's risk

management framework and is responsible for the day-to-day activities associated with coordinating, maintaining and embedding the framework within the department. S/he develops risk reporting to the Audit and Risk Committee and other committees as required. S/he supports the department, groups, directorates, divisions, branches and programs to embed effective risk management practice and maintain an appropriate internal control environment.

i. **Risk Owner** - The risk owner is the person who has responsibility for designing, implementing and monitoring risk treatments for a particular risk. The risk owner is accountable for ensuring that the risk is managed in accordance with the agency's ability to accept or tolerate risk. S/he must be knowledgeable about the activity for which the risk is being assessed.[14]

j. **All employees** - It is every department members' responsibility to apply the DPE risk management policy in accordance with their functional roles and responsibilities. It is also a responsibility of all members to raise and/or escalate risks, concerns and/or behaviours. This complements the requirements of the Workplace Health and Safety Act which requires workers to:

> ...comply with any reasonable policy related to health and safety at the workplace. [15]

This applies to all contractors working in support of the department.[16]

2.2.9 The duties of contracted aviation suppliers. Within the context of this risk management framework, DPE will engage an aviation service provider. The service provider will be an approved provider to the NSW Government and will hold the necessary approvals and instruments from the Civil Aviation Safety Authority for the task. The role of the aviation service provider is to provide the following:

a. a suitable aircraft for the aerial inspection that meets the performance requirements of the contract

b. suitably qualified aircrew to operate the aircraft in order to obtain the data required by the department on a roster that meets the needs of the department's program

c. suitably qualified support personnel to support the aircraft's operations on a roster that meets the needs of the department's program

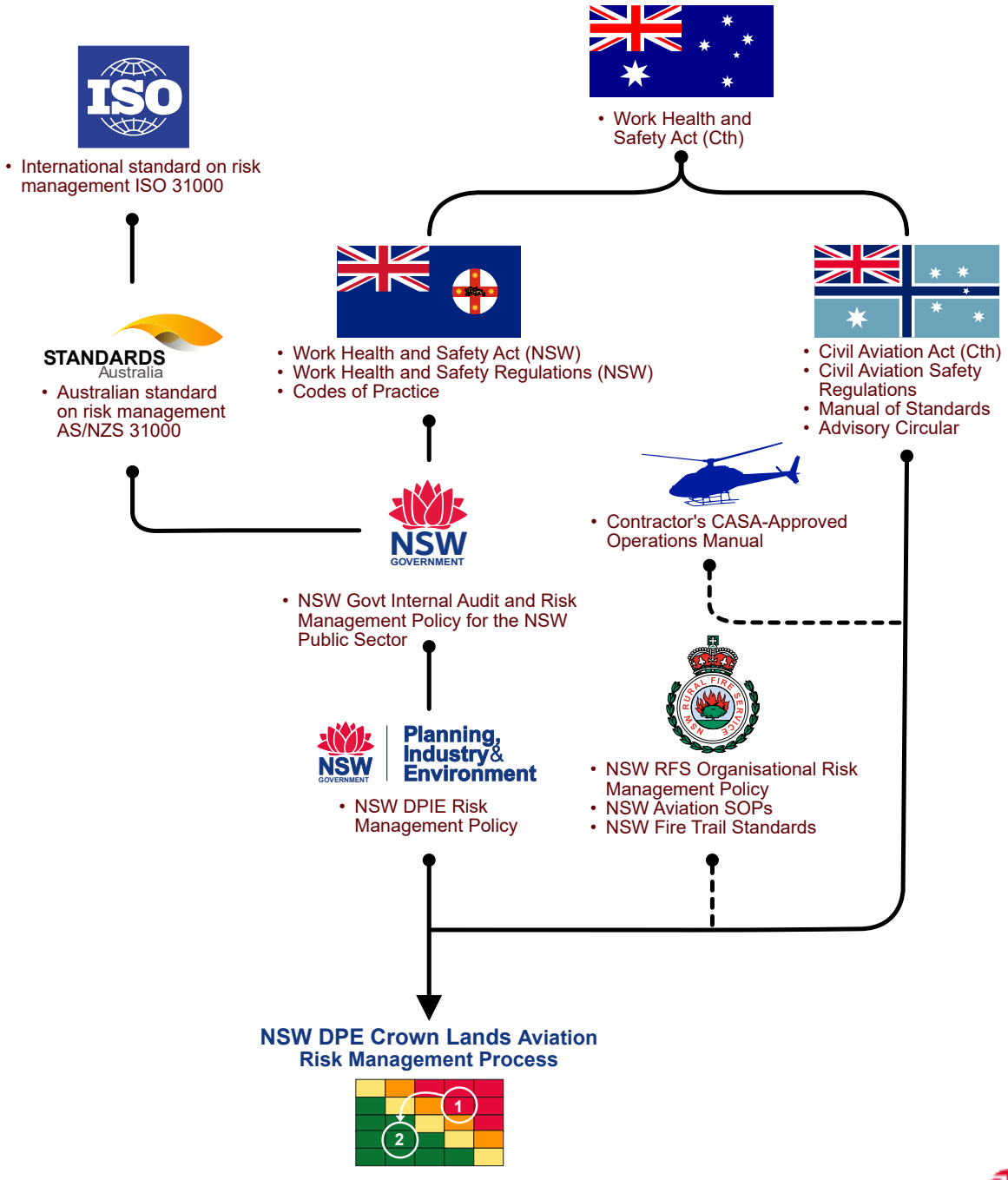
d. operations and administration support including a CASA-approved operations manual

e. any training or enabling support within the contract's terms.

Crown Lands Risk Management

Contributing resources

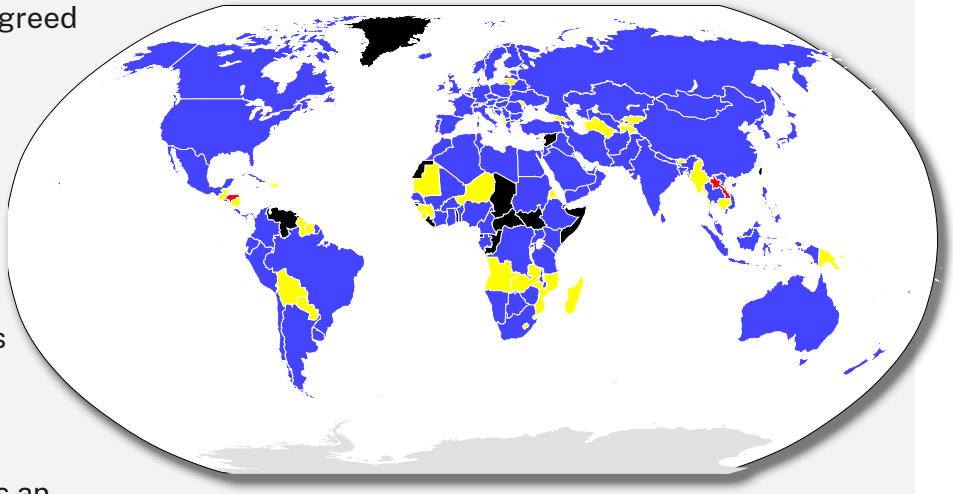
The DPE Crown Lands' aviation risk management process is derived from various standards and policies along with inputs from the requirements of key stakeholders. The diagram below provides context on the contributing resources and their parent/child relationships. The final result is the risk management process.



Section 2.3: Risk Management Framework Technicalities

2.3.1 Uniformity in processes. In order for a process to be effective, it needs to be simple to understand and teach, and simple to employ within the context it is to be used. Furthermore, if a process can have polyvalence, that is to say, wide-ranging utility in many contexts, then its efficacy will be enhanced.

2.3.2 The International Standards Organisation - ISO. There were two key standards organisations that existed prior to WWII. The International Electrotechnical Commission (IEC) had been founded in 1906 to standardise the expanding electrical industry while the International Federation of the National Standardization Associations, known as ISA, was primarily composed of countries using the metric system, and was more general in its scope of interests. Being made up of metrified countries, those countries using the imperial system — such as the US and the UK — were not involved. When the United Nations was formed in 1944 it was agreed that international standardisation should be a priority and so the United Nations Standards Coordinating Committee was founded. It joined with ISA in 1946 and the International Standards Organisation was formed with 25 countries represented.[1]



ISO member countries (in blue) with correspondent countries (notified on standards) and observer countries in black

2.3.3 Today, ISO is an independent, non-governmental international organisation. Membership consists of the national standards bodies of 167 nations, including Standards Australia.[2] Standardisation supports global trade, inclusive and equitable economic growth, advances innovation and promotes health and safety to make lives easier, safer and better.[3] ISO achieves this through using technical committees to investigate various activities and processes, come up with a standard and then promulgate that standard internationally through national standards bodies that are members of ISO.

2.3.4 Risk management standards. ISO provides guidance on risk management. This guidance comes in the form of guidelines from which organisations can derive their own risk management frameworks using standardised terms and recommended methodologies. Not all organisations have the same needs and so prescriptive measures cannot be effectively applied to all situations. The current ISO standard is ISO 31000:2018 as at time of writing. This is accompanied by ISO standards on a risk vocabulary (ISO Guide 73) and risk assessment techniques (ISO 31010:2019).[4]

2.3.5 Australian standards for risk management. The ISO standards are derivations of the Australian standards, AS/NZS 4360:1995 released in the 1990s.[5] Australia led the way in risk management with much work emanating out of Queensland. When ISO

adopted the Australian methodologies it adjusted them to harmonise terminology which did not translate well into other languages. Over the years since, the ISO standard has been revised and has matured such that it is now "self-supporting and somewhat homogenous" as a document and standard.[6] The Australian standard for risk management is the adoption of the ISO standard with some minor editorial changes and branded with the Australian Standards logo

2.3.6 The aim of ISO was to standardise risk management by creating:

- a common vocabulary (ISO Guide 73)
- a set of performance criteria
- a common, overarching process for identifying, analysing, evaluating and treating risks
- guidance on how the process should be integrated into the decision-making processes of any organisation.[7]

2.3.7 **NSW State Government Requirements.** The NSW Government risk management standards have been discussed in detail in the previous section and the requirements of *PP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*

ISO guidance comes in the form of guidelines from which organisations can derive their own risk management frameworks using standardised terms and recommended methodologies.

2.3.8 **NSW Aviation Standard Operating Procedures.** The various NSW and ACT government agencies that use aviation are encouraged to adhere to these standard operating procedures promulgated by the State Air Desk and read them in conjunction with specific agency doctrine, the Australasian Interagency Incident Management System (AIIMS) and relevant contract documents.[8] These SOPs incorporate risk management and workplace health and safety requirements.

2.3.9 **Other agencies and harmonisation.** The NSW Rural Fire Service (NSW RFS) and the DPE have complementary roles and requirements in ensuring that the state's fire trails network are serviceable and managed in accordance with the *Rural Fires Act*. The tasks engaged by the NSW RFS relating to aerial inspection are similar to that of the DPE and so NSW RFS risk management processes have been reviewed and integrated into this process as far as practical to achieve the maximum harmonisation between the two agencies.

2.3.10 **NSW Department of Primary Industry.** The risk management procedures used by the NSW DPI have, hitherto, been the ones used by DPE. They have also been reviewed and integrated as far as possible.

2.3.11 **Contracted agencies and aviation risk management.** The Civil Aviation Safety Authority (CASA) has reviewed risk management practices for aerial work operations, under which aerial inspection activities fall. CASA follows the International Civil Aviation Organisation's (ICAO) recommendations as part of its international compliance and harmonisation. ICAO's Safety Management Manual provides guidance for all aviation authorities to promulgate. The recommended methodologies include ISO 31000:2009 and

associated risk management guidance issued by ISO including *ISO 31010:2019 Risk management risk assessment techniques.*[9]

2.3.12 Conformity to standards. In order to conform with NSW Government policy, the process aligns itself as closely as possible to the approved guidance material issued by the NSW Government, particularly *TPP 12-03 Risk Management Toolkit for NSW Public Sector Agencies.* At the same time, comparisons are drawn from other agencies and aviation safety risk management to create an ISO 31000 compliant and harmonised process that is contextualised for aerial inspection operations.

2.3.13 Purpose and design of an internal audit and auditing committee. Besides the actual risk management framework the two other guiding principles of policy is the internal audit function and the internal audit and risk committee. The internal audit function must not only be established, it must perform to international standards and in accordance with its own charter which must be consistent with a 'model charter' supplied by policy.

2.3.14 The internal audit and risk committee, likewise, is established with suitably qualified persons. An agency's internal audit function provides assurance that risk controls are appropriately designed and effectively implemented and that the agency's risk management framework is effective,[10] who facilitate the audit and advise the agency head on compliance so that he or she can attest to Treasury that his/her agency is compliant with policy or not.

Endnotes - Chapter 2

Section 2.1

1. The definition of 'officer' is laid out in the *Corporations Act 2001* and, in summary, means any person who makes or participates in decisions that affect the whole or a substantial part of the business or corporation or entity, (whichever is applicable), and who has the capacity to affect significantly the business'/corporation's/entity's financial standing. A full definition can be found in the Act. *Corporations Act 2001 (C'th)*, s 9.
2. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 27.
3. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 47.
4. Australian Government, *Workplace Health and Safety Act 2011 (C'th*), s 49.
5. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 14.
6. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 15.
7. A worker is a person who is carrying out work in any capacity for a person conducting a business or undertaking. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 7.
8. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 28.
9. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 8.
10. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 17.
11. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 46.
12. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 48.
13. Australian Government, *Workplace Health and Safety Act 2011 (C'th*), s 31.
14. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s 32 and s 33.
15. There are different levels of offence according to the Act depending on the severity and type of offence committed.
16. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, p. 7.
17. NSW Government, *TPP 15-03 Internal Audit and Risk Management Policy for the NSW Public Sector - Policy Guidelines V1.0*, NSW Treasury, Sydney, 2015, p. 7.
18. NSW Government, *TPP 15-03 Internal Audit and Risk Management Policy for the NSW Public Sector - Policy Guidelines V1.0*, NSW Treasury, Sydney, 2015, p. 7.
19. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, p.8.
20. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, Annexure J.
23. NSW Government, *Risk Management Policy*, Department of Planning, Industry and Environment, Jun 2020, Para. 3.
24. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, p. 10.
25. NSW Government, *Annual Reports (Statutory Bodies) Act 1984* No 87, s. 15, p. 9

Section 2.2

1. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s. 17.
2. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s. 18.
3. International Standards Organisation, *ISO 31000:2018 Risk Management - Guidelines*, para. 5.1
4. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, para. 1.2.2.
5. NSW Government, *NSW Department of Planning, Infrastructure and Environment Annual Report 2019-20,* PUB20/763, Sydney, 2020, p. 87.
6. NSW Government, *Risk Management Policy*, Department of Planning, Industry and Environment, Jun 2020, para. 2.
7. NSW Government, *NSW Department of Planning, Infrastructure and Environment Annual Report 2019-20*, PUB20/763, Sydney, 2020, p. 87.
8. NSW Government, *Risk Management Policy*, Department of Planning, Industry and Environment, Jun 2020, Sydney, 2020, para. 3.
9. NSW Government, *NSW Department of Planning, Infrastructure and Environment Annual Report 2019-20*, PUB20/763, Sydney, 2020, p. 97.
10. NSW Government, *Risk Management Policy*, Department of Planning, Industry and Environment, Jun 2020, Sydney, 2020, Appendix 1.
11. NSW Government, *NSW Department of Planning, Infrastructure and Environment Annual Report 2019-20*, PUB20/763, Sydney, 2020, p 370.
12. NSW Government, *NSW Department of Planning, Infrastructure and Environment Annual Report 2019-20*, PUB20/763, Sydney 2020, p. 96.
13. NSW Government, *TPP 12-03b Risk Management Toolkit for NSW Public Sector Agencies: Vol 1*, NSW Treasury, 2012, p. 22.
14. Australian Government, *Workplace Health and Safety Act 2011 (C'th)*, s. 28.
15. NSW Government, *TPP 12-03b Risk Management Toolkit for NSW Public Sector Agencies: Vol. 1*, NSW Treasury, 2012, p. 22.

Section 2.3

1. ISO Central Secretariat, *Friendship among equals - Recollections from ISO's first fifty years*, International Standards Organisation, Geneva, 1997, pp. 15 -18.
2. International Standards Organization website, www.iso.org, accessed 23 Mar 22.

3. International Standards Organization website, *ISO's Vision and ISO's Mission as part of its Strategy 2030*, www.iso.org, accessed 23 Mar 22

4. International Standards Organization website, www.iso.org, accessed 27 Dec 21.

5. Purdy, G., 2009, 'Raising the Standard — the New ISO Risk Management Standard', *Society for Risk Analysis*, Wellington Meeting, 2009, p. 883.

6. Purdy, G., 'ISO 31000:2009 — Setting a New Standard for Risk Management, *Society for Risk Analysis*, *Risk Analysis Vol 30*, No 6, 2010, DOI: 10.1111/j.1539-6924.2010.01442.x. 2010, p. 885.

7. Purdy, G., 'ISO 31000:2009 — Setting a New Standard for Risk Management, Society for Risk Analysis, *Risk Analysis Vol 30*, No 6, 2010, DOI: 10.1111/j.1539-6924.2010.01442.x. 2010, p. 881.

8. NSW Rural Fire Service, *NSW and ACT Aviation Standard Operating Procedures, 2018* - Version 4.1, Sydney, 2018, Preface.

9. International Civil Aviation Organization, *Doc 9859 Safety Management Manual, Edn 4*, Montreal, 2018.

10. NSW Government, *TPP 12-03b Risk management toolkit for NSW Public Sector Agencies, Volume 1: Guidance for Agencies, Policy and Guidelines*, NSW Treasury, 2012, p. 23

Crown Lands Risk Management

Scope of risk assessments

The scope of a risk assessment will be dependent on the relevance of the risk to the level. A strategic risk relating to the aerial inspection program may not have an impact on an inspection flight, and a risk associated with an inspection flight may have little or no impact at the strategic level.

The diagram below helps to illustrate what is meant by 'considering the scope' of the risk and at what level the risk assessment should occur and by whom.

Note how the scopes overlap.

When conducting a risk assessment at the strategic level, the scope might include such considerations as:

- Committing to election promises
- Executing the recommendations from a public enquiry
- Undertaking a public affairs plan such as public notifications
- Cooperating with other departments or agencies

When conducting a risk assessment at the program (operational) level, the scope might include such considerations as:

- Acquiring a suitable aviation contractor
- Ensuring enough personnel are trained to conduct the task
- Planning the campaign and its associated logistics and managing risk
- Cooperating with other departments or agencies

When conducting a risk assessment at the tactical level, the scope might include such considerations as:

- Weather
- Availability of fuel
- Terrain
- Fitness for flight of personnel

Part 3: Setting the scene with scope, context and criteria

Section 3.1: Scope

3.1.1 Establishing the scope, context and criteria. For a risk management framework and its processes to be effective, it needs to be done so within the context of the organisation and its activities and as far as the scope of those activities require. Coupled with the previous sections that discuss why risk management frameworks are required by Commonwealth law and NSW state policies, the next sections outline the scope of the framework being devised, the context of the organisation's needs — as well as those of external stakeholders — and the criteria to be used.

3.1.2 Don't re-invent the wheel. As discussed in Section 2, there are legislated requirements for workplace health and safety and policy directives for the establishment of risk management frameworks that supports an agency to achieve its objectives by systematically identifying and managing risks to increase the likelihood and impact of positive events and mitigate the likelihood and impact of negative events.[1]

3.1.3 Within the framework for risk management required by policy, the risk management framework discussed in this document relates to the program of the systematic aerial inspection of fire trails by helicopter conducted by the Land and Asset Management directorate of the Crown Lands agency of DPE. The current risk management process is derived from a sister agency (DPI) and is a thorough method of conducting risk management at a practical level. In accordance with advice from NSW Government,

> *"if an existing risk management process is in place, there is no need to 'reinvent the wheel'. Instead, use the [Risk Management] Toolkit to benchmark your risk management practices, and improve and align them with ISO 31000."*[2]

3.1.4 Defining the scope. Previous risk assessments relating to aerial inspection work for DPE has been, more or less, confined to the tactical level. This means that when risks were considered and assessed, and controls put in place, they were centred around the actual aerial inspection flights. But risk management can be used at higher levels — and internally as well as externally — as described below. The assessors and risk owners and decision-makers will change depending on the level of the scope.

3.1.5 External Scope - Strategic. The following are some considerations that might be investigated and applied at the strategic level, as discussed with key members of the DPE.

- Political considerations- the bushfire enquiry, bushfire response, NSW Govt responsibility, election campaigns, public opinion, inter-departmental cooperation
- Economic considerations - Cost of bushfires, cost of upgrade of trails, budget pressures
- Socio-cultural considerations - Bushfire fighting, part of Australian culture
- Technological considerations - New equipment, new procedures
- Laws and Regulations considerations - Compliance with *WHS Act*, *Rural Fires Act*, etc

- Environmental considerations - maintenance of natural assets and minimising damage

3.1.6 External Scope - Operational / Tactical. The considerations at the operational level overlap, in many cases, with the considerations at the tactical level and so both levels are included when looking at the external scope and the internal scope. Some external considerations for both levels are as follows:

- Political considerations - inter-agency cooperation, facilitating the work of other departments
- Economic considerations - cost of contract, better use of funds compared to ground-based inspections, cost of program, budgeting
- Socio-cultural considerations - different values between organisations
- Technological considerations - use of technology may incur a training liability or reliability cost
- Laws and Regulations considerations - internal processes, aviation rules
- Environmental considerations - landing sites, noise complaints.

3.1.7 Internal Scope - Operational / Tactical. The internal scope of considerations at the operational and tactical levels will mainly be concerned with the 'nuts and bolts' of doing the job. How many people have been trained? Where will refuels occur? Who will take responsibility for deciding if a flight goes ahead or not? The internal scope usually does not involve external stakeholders as a rule, although they may have a vested interest in the outcomes of the activities. Some examples of the internal scope of considerations for a risk assessment at the operational and tactical levels are as follows:

- Objectives considerations - successful use of aerial inspection capability to assess fire trails
- Capability considerations - personnel trained in mission crew techniques, Aerial Inspection techniques and requirements and the technology to gather the data, aircraft and its reliability, aircrew and their capabilities
- Stakeholder considerations - DPE, RFS, BFMC/BFCC members
- Structure considerations - State Bushfire Coordinator / Aerial Inspection Program Coordinator as risk owners
- Environment considerations - environmental factors (weather, wildlife, onlookers, traffic)

3.1.8 Defining the context. The context of the aerial inspection from a regulatory aspect has been discussed and is laid out in the next sections where the history of the program is discussed and the outputs and outcomes of internal and external stakeholders is articulated based on the outputs of the activity.

3.1.9 Defining the risk criteria. The risk criteria is the evaluation of the significance of the risk to the organisation, how they are measured and whether it is acceptable or not. This is the 'Go/No-go' aspect of risk management.[3]

Section 3.2: Background context - aerial inspection of fire trails

3.2.1 **Fire trails.** Access by firefighters and their vehicles to remote areas is vital if bush fires are to be fought and associated hazards such as overgrowth mitigated. The statewide network of fire trails is a key component of New South Wales' ability to prevent, fight, manage or contain fires in order to protect life and assets.[1] According to the New South Wales Rural Fire Service, it is estimated that NSW has 75,000 kilometres of firetrails.[2] Fire trail aerial inspection is a key mission of the DPE, particularly on Crown lands which cover approximately 42% of the state of NSW.[3] This is a responsibility and duty as stipulated in the *Rural Fires Act* which says that designated or registered fire trails and their maintenance and rectification are the responsibility of the owner or occupier of the land.[4]

3.2.2 **Outcomes of NSW Bushfire Inquiry.** The disastrous bush fire season of 2019-2020 saw a bush fire inquiry being established with four key terms of reference and instructions to make recommendations arising from the inquiry.

3.2.3 One of the terms of reference of the bush fire inquiry was to review the preparation and planning by agencies, government, and other entities as well as the community, for bush fires in NSW including current laws, practices and strategies, and building standards and their application and effect. Recommendations were to also include preparation and planning for future bush fire threats and risks and land use planning and management.[5]

Some fire trails are easy to inspect from the air and can be assessed relatively quickly. Others are more obscured by tall vegetation requiring a closer and slower inspection. (Image by Conway Bown)

3.2.4 Fire trails inadequate during the bush fire response. The bush fire inquiry heard that even though there had been amendments to the *Rural Fires Act 1997* concerning the management of fire trails, during the 2019/2020 fire season the fire trails were not adequately maintained resulting in "significant delays accessing fires, and that this allowed the momentum and intensity of the fires to build."[6]

3.2.5 Aerial inspections of DPE managed land. There are approximately 8,000 kms of trails on Fire Access and Fire Trail (FAFT) plans on Crown land in NSW.[7] DPE conducts aerial inspections of fire trails on Crown land in order to comply with the requirements of the *Rural Fires Act* to ensure their integrity and to ascertain which trails require upkeep and maintenance. The aerial inspections provide information on the status of the trails and whether they remain compliant with the *NSW Fire Trails Standards* which require land managers responsible for fire trail maintenance to provide to the NSW RFS Commissioner a statement on the condition of each designated and registered fire trail on its land.[8] The information gathered helps to inform decision-making by authorities.

3.2.6 Fire trail aerial inspections on behalf of other agencies. Initially, the DPE fire trail aerial inspection program only concerned itself with those trails that were on NSW Crown land, but as the program became more advanced and more streamlined, inspecting those trails that crossed land that were in the areas of responsibility of other agencies became feasible as part of the program. DPE now conducts aerial inspections that provide data for itself, but also for other government agencies wherever possible within the limitations of its aerial inspection program.[9] These aerial inspections are normally carried out by DPE personnel, but representatives from other agencies (eg NSW RFS) may accompany DPE on their missions.

3.2.7 Bush fire committees and fire trails. Across NSW a number of representative committees are raised to coordinate bush fire mitigation activities. The state-based NSW Bush Fire Coordinating Committee (BFCC) is the most senior. Subordinate to the BFCC are the 56 committees responsible for their geographic areas.[10] These Bush Fire Management Committees (BFMCs) are raised within local areas with representatives from key stakeholders attending their meetings. The information derived from the DPE aerial inspection program helps to inform the BFMCs on the status of the trails in their areas of responsibility so that Bush Fire Risk Management Plans (BFRMPs) and FAFT plans[11] can be prepared and any maintenance required to bring fire trails up to standard can be coordinated and resourced.[12] The BFCC policy requires BFMCs to ensure their FAFT plans are prepared in accordance with the Fire Trail Standards that are current at the time and that they include all the trails and access ways that form the fire trail network in their area of responsibility and that they are prepared with a five-year planning timeframe.[13]

3.2.8 Fire trail standards. A set of standards entitled the *NSW RFS Fire Trail Standard 2016*, the 'Standards', designed to achieve an integrated fire trail network across the state is published by the NSW RFS in accordance with the *Rural Fires Act*.[14] They set out the design and construction requirements for identified fire

trails and help to inform decision-making and prioritisation in their upkeep and maintenance.

3.2.9 Fire access and fire trail plans (FAFT plans). The *Rural Fires Act* requires the state's 56 BFMCs to prepare FAFT plans for their relevant areas and that the pre-season condition of this network is satisfactory. The fire access and fire trail plans are to comprise a map showing a base layer of all existing vehicular tracks, trials and roads and the identified fire trail network for that area. They must also include other information such as its status carrying capacity current conditions and the responsible agency. BFMCs must submit their plans for approval by the BFCC every five years so that the rural fire service commissioner may certify and register the trails on the RFS website.[15]

Once a plan is approved, an assessment statement must be submitted to the RFS by land managers and land owners. In the case of public land, the land manager must provide an annual statement on the condition of each designated and registered fire trail on the land and whether it meets the standards. The inquiry found that plans submitted to the BFCC for approval often did not have an assessment accompanying it. Without established plans and accurate information about the condition of the trails, enforcement powers under the Act cannot be undertaken.[16]

The 56 Bush Fire Management Committee regions through NSW at time of writing including Lord Howe Island (1) and the seven in the vicinity of Sydney (2).
Image from *Bush Fire Management Committee Handbook, Appendix A*

Section 3.3: Internal context - mission crew, risk acceptance, roles and training

3.3.1 **What is a mission crew?** A mission crew is the team that is put together to complete a mission or a task and which, along with flight crew and air crew, forms an aviation team. Mission crew are usually drawn from non-aviation qualified personnel who use aircraft as a part of their job on a semi-regular or intermittent basis. Examples of mission crew are members of a volunteer fire fighting service who may use an aircraft for aerial observation, or perhaps members of the Department of Primary Industries who use aircraft for the aerial survey of wildlife. Recently, the Civil Aviation Safety Regulations (CASRs) have termed them 'task specialists'.

3.3.2 **Who is an air crew member?** According to the CASRs, an air crew member is a crew member for a flight of an aircraft (other than a flight crew member) who carries out a function during the flight relating to the safety of the operation of the aircraft or the safety of the use of the aircraft. An example would be a winch operator that uses specific, on-board, aircraft-fitted equipment.[1]

3.3.3 **Who is a flight crew member?** According to the CASRs, a flight crew member is a pilot or a flight engineer assigned to carry out duties essential to the operation of an aircraft during flight time.[2]

3.3.4 **Who is a task specialist?** According to the CASRs, a task specialist for an aerial work operation, means a crew member for a flight:

a. who carries out a function for the flight relating to the aerial work operation; and

b. who is not a flight crew member or an air crew member for the flight.[3]

3.3.5 **Task specialists and aerial work operations.** The aerial inspection of fire trails constitutes aerial work. Mission crew engaged in this work are task specialists. In accordance with the CASRs, an operator or pilot must:

a. ensure that the task specialist/s are competent in carrying out normal, abnormal and emergency procedures for the aircraft and the operation that requires the task specialists' skills[4]

b. that the relevant task specialist procedures (eg aerial inspection) are appropriate for the nature, size and complexity of the aircraft and the operation and that they are set out in the operator's operations manual.[5]

3.3.6 **Aerial work passengers.** The *Part 138 Manual of Standards (MOS)* outlines a class of passenger that is also applicable called an aerial work passenger.[6] An aerial work passenger is a person who is on board for a purpose that is 'reasonably and closely associated with the purpose of the operator's aerial work operations' and who is 'mentioned in the operations manual where it describes why the person is present and what procedures for the person's safety and personal awareness of risks'.

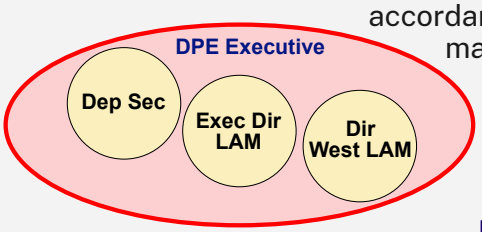
3.3.7 The MOS goes on to describe examples of an aerial work passenger which includes persons involved in such things as collecting data for a safety management system, or doing training and checking, or any task that helps an operation to be completed. In this case, a person who is required to be on board during in an aerial inspection task but not conducting an aerial inspection (eg a property owner assisting the crew to locate specific areas), or another person who is associated with the task and not merely on board for pleasure or for convenience, can be considered to be an aerial work passenger. Such persons may be approved to be carried on an aerial work flight at the

discretion of the pilot in command. Emergency services operations personnel are singled out for specific mentioning in the definition of aerial work passengers.[7]

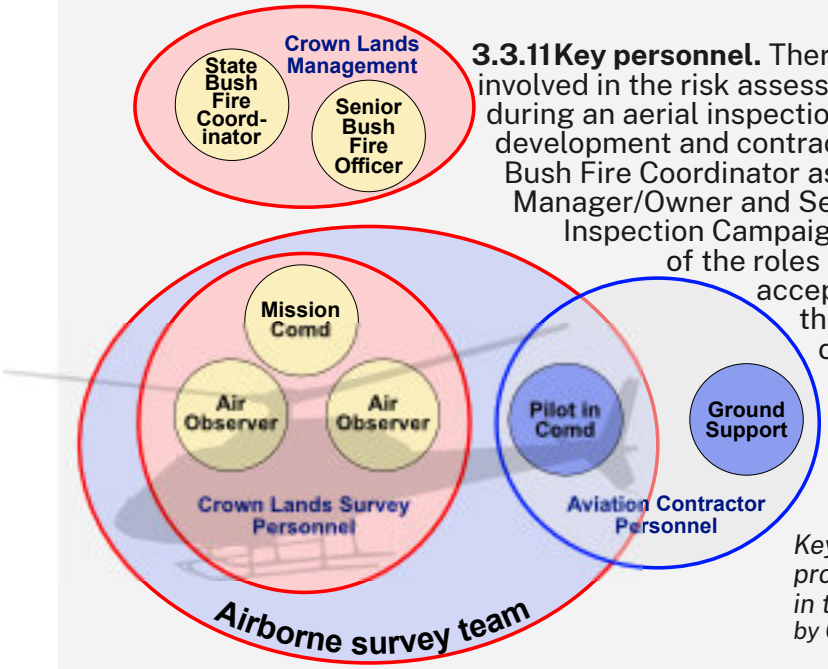
3.3.8 What does this mean for a task specialist mission crew? The operator must have procedures in their operations manual relevant to the nature of the mission. For the aerial inspection of fire trails, this would be described as an 'aerial inspection' or similar in the operations manual. The operator is responsible for ensuring that the task specialist is competent to carry out the tasks. This could be in the form of a pre-mission brief, but the operator must be satisfied that the briefing adequately covers the relevant procedures and that the task specialist is capable of carrying them out.[8] The mission crew training provided to DPE by IPAS far exceeds the minimum standard of training required for a task specialist conducting aerial inspection flights.

3.3.9 Specific risks for mission crew. Mission crew, whilst on board an aircraft, will encounter the same threats as aircrew, however because a professional aircrew member's primary job is flying, and he or she may spend hundreds of hours a year flying, then an aircrew member's exposure will be significantly more than that of a member of mission crew who may only be flying for a few hours each year. During the actual flight, however, exposure will be the same. When looking at the the mission crew as members of the DPE, then the threats that a member of mission crew would be exposed to — due to their flying roles — will be different to other members of the DPE who, perhaps, spend all their time in an office. When conducting risk assessments it is imperative to put exposure and likelihood into context before assessing inherent risk.

3.3.10 Risk information. The process for risk management within the aerial inspection program has been designed so that information about mission crew risk at the tactical (flight) level is communicated between team members in the first instance, and from the team upwards to the risk owners (program manager & program coordinator) who make decisions about risks and who oversee the process and track risks. This is in accordance with recommendations made in the risk management toolkit.[9] Various hazards and associated risks have also been derived from data from various government agencies and from historical records and are explained later in Part 4.



Key personnel, roles and enablers



Key personnel in the aerial inspection program and the roles that are involved in the risk management process. (Image by Conway Bown)

3.3.11 Key personnel. There are specific personnel that are involved in the risk assessment and acceptance process during an aerial inspection campaign. During the campaign development and contract development phase the State Bush Fire Coordinator as the Inspection Campaign Manager/Owner and Senior Bush Fire Officer as the Inspection Campaign Coordinator undertake the bulk of the roles relating to coordination and risk acceptance. During the flying phase the mission commander and air observers, along with the pilot in command and ground support personnel assess and accept/reject risks associated with the missions.

3.3.11 Roles and Responsibilities. The following paragraphs derived through consultation with DPE managers[10] describe what each person does and what level of risk they are authorised to accept and what training and skills that they should have to be a functioning member of the aviation team.

3.3.12 Deputy Secretary, Executive Director - Land and Asset Management, Director - Regional Operations. These senior executives approve and 'sign off' the campaign program. They accept risk at the strategic level for the department's responsibility in assessing Crown lands for risks associated with bush fire, which includes the aerial inspection and assessment of the state's fire trails, and providing the information gathered to stakeholders in other departments and agencies.

a. His or her role includes:

i. overall responsibility for the approval of an aerial inspection program and associated contracts

ii. overall responsibility for accepting the risk of the aerial inspection program and for risks assessed as critical

iii. managing resources such as budgets and labour to enable an aerial inspection program

b. He or she must be able to:

i. understand the requirements of an aerial inspection and desired outputs (eg information on the status of fire trails) that inform strategic decision-making, and the operational requirements to achieve these outputs

ii. understand the training and resourcing required for an aerial inspection program to achieve greatest efficiency and safety in obtaining the desired outputs

iii. facilitate the acquisition of resources to enable an aerial inspection program.

c. He or she is enabled by:

i. briefings on operational matters by subordinates to assist in decision-making

ii. an undertanding of departmental risk management and other safety processes

iii. knowledge and expertise in departmental processes to obtain resources for the execution of an aerial inspection program.

3.3.13 State Bush Fire Coordinator. The State Bush Fire Coordinator (SBFC) is the senior member of the aerial inspection program and the link between the strategic and operational/tactical levels.

a. His or her role includes:

i. responsibility for the management of the aerial inspection program

ii. assessing and owning the risk for the conduct of the aerial inspection program

iii. the ability to approve individual aerial inspection flights when required, particularly when the residual risk is high.

b. He or she must be able to:

i. understand the requirements of an aerial inspection and the skills required to undertake an aerial inspection mission

ii. conduct briefings up and down the management chain

iii. liaise with stakeholders within the DPE and outside the department

iv. understand the roles of bush fire officers and air observers.

c. He or she is enabled by:

i. training in mission crew techniques which includes the relevant knowledge elements contained in Working Safely Around Aircraft and Team Resource Management training

ii. significant relevant experience in DPE internal processes

iii. significant experience in bushfire mitigations for DPE and similar assets (eg fire trails, forested areas, other assets that may be threatened by bush fire)

iv. an understanding of risk management concepts relating to aerial inspection tasks

v. briefings on operational matters by subordinates.

3.3.14 Senior Bush Fire Officer (as aerial inspection program coordinator). The Senior Bush Fire Officer (SBFO) is the primary coordinator of the aerial inspection program.

a. His or her role includes:

i. undertaking the coordination of the aerial inspection program

ii. assessing and owning the risk for the aerial inspection program

iii. being lead planner for aerial inspections flight routes

iv. the ability to approve individual aerial inspection flights when required, particularly when the residual risk is medium.

v. conducting aerial inspections when required

vi. assessing the aerial inspection program for continuous improvement.

b. He or she must be able to:

i. understand the requirements of an aerial inspection and the skills required to conduct them

ii. conduct briefings up and down the management chain

iii. liaise with stakeholders within the DPE and outside the department

iv. understudy the State Bushfire Coordinator.

c. He or she is enabled by:

i. training in mission crew techniques which includes the relevant knowledge and skills elements contained in Working Safely Around Aircraft and Team Resource Management training

ii. significant relevant experience in DPE internal processes

iii. significant experience in bushfire mitigations for DPE and similar assets (eg fire trails, forested areas, other assets) that may be threatened by bush fire

iv. an understanding of risk management concepts relating to aerial inspection tasks

v. briefings on operational matters by subordinates.

3.3.15 Mission Commander. The mission commander's role is the team leader for an aerial inspection mission.

a. His or her role includes:

i. risk assessor for individual aerial inspection flights

ii. accepting/rejecting mission risks below medium

iii. leading pre-mission briefings for the aerial inspection team

iv. briefing the SBFO/SBFC on the mission including any referral of risk

v. conducting aerial inspection flights as lead assessor of fire trails, recording and storing of data, interpreting data

vi. making decisions during the planning/conduct of the mission

vii. supervising/mentoring air observers (when required)

viii. monitoring the performance of contracted service providers and KPIs

ix. providing post-mission de-briefs to the SBFO/SBFC(AIC) and keeping records

x. conducting other aviation-related tasks and supervision in accordance with aviation SOPs and WHS requirements

b. He or she must be able to:

i. understand the requirements of an aerial inspection and the skills required to undertake them

ii. provide briefings and back briefings upwards to the SBFO/SBFC (AIC) and pre-mission briefings and de-briefings laterally amongst the team

iii. make operational judgments and decisions during a mission

iv. discuss and understand aviation-related variables with aviation personnel in order to make mission-relevant decisions

v. assist with planning of flight routes for aerial inspections

vi. supervise/mentor other team members when necessary

vii. assess fire trails according to the fire trail standards as issued by the RFS or other relevant authority and provide data for recording

viii. monitor the in-flight conditions relevant to the safety of flight

ix. operate, cooperate and communicate as a member of the aviation team

x. gather, understand, record and report lessons learnt

xi. provide feedback to team members on performance

xii. provide feedback to management relating to the mission and any perceived issues that may cause concern including threats and opportunities

xiii. decide what aviation-related tasks are required to be executed that are in accordance with SOPs and WHS requirements.

c. He or she is enabled by:

i. training in mission crew techniques which includes the relevent knowledge and skills elements contained in Working Safely Around Aircraft and Team Resource Management training

ii. significant relevant experience in DPE internal processes

iii. experience in aerial inspection techniques and a knowledge of the fire trail standards

iv. an understanding of risk management concepts relating to aerial inspection tasks

v. an understanding of environmental, physical, physiological and psychological factors that affect aviation operations

vi. an understanding of aviation capabilities of aircraft and the relevant rules and regulations that pertain to low-level operations and other aspects of an aerial inspection mission

vii. an understanding of what aviation-related tasks are required to be executed that are in accordance with SOPs and WHS requirements

viii. briefings on operational matters by management and subordinates.

3.3.16 Air Observer. The air observer (sometimes also referred to as the Air Surveillance Officer) role is as a team member for an aerial inspection mission.

a.His or her role includes:

i. assessing risks with the mission commander for individual aerial inspection flights

ii. accepting/rejecting mission risks below medium

iii. participating in pre-mission/post-mission briefings

iv. conducting aerial inspection of fire trails, and recording and storing and interpreting data

v. assisting with decision-making during the planning/conduct of the mission

vi. supervising passengers (when required)

vii. performing aviation-related tasks in accordance with aviation SOPs and WHS requirements

b. He or she must be able to:

i. understand the requirements of an aerial inspection and the skills required to undertake them

ii. in consultation with the mission commander, assess risks associated with aerial inspection and make decisions on their effect on the mission and the team

iii. assist with planning of flight routes for aerial inspections

iv. assess fire trails according to the fire trail standards as issued by the RFS or other relevant authority and provide data for recording

v. monitor the in-flight conditions relevant to the safety of flight

vi. operate, cooperate and communicate as a member of the aviation team

vii. apply aviation safety procedures and supervise others who may not be a part of the aviation team

viii. decide what aviation-related tasks are required to be executed that are in accordance with SOPs and WHS requirements.

c. He or she is enabled by:

i. training in mission crew techniques which includes the relevent knowledge and skills elements contained in Working Safely Around Aircraft and Team Resource Management training

ii. relevant experience in DPE internal processes

iii. experience in aerial inspection techniques and a knowledge of the fire trail standards

iv. an understanding of risk management concepts relating to aerial inspection tasks

v. an understanding of environmental, physical, physiological and psychological factors that affect aviation operations

vi. an understanding of what aviation-related tasks are required to be executed that are in accordance with SOPs and WHS requirements

vii. briefings on operational matters.

3.3.17 Pilot in Command. The Pilot in Command's (PIC) role is as a team member for an aerial inspection mission specialising in the safe and efficient operation of the aircraft.

a. His or her role includes:

i. assessing risks related to aviation and consulting with the mission commander for individual aerial inspection flights

ii. accepting/rejecting mission risks in accordance with the contractor's risk management framework

iii. conducting pre-mission flight planning and cooperating with the mission commander for his/her pre-mission planning

iv. participating in and contributing information to the mission commander's pre-mission/post-mission briefings

v. conducting aviation safety briefs

vi. operating the aircraft on aerial inspection of fire trails and associated flights and ensuring that it is fit-for-flight in accordance with the CASRs and that the flights are conducted in accordance with all relevant aviation rules and procedures and the requirements of the contract

vii. assisting with decision-making during the planning/conduct of the mission

viii. supervising crew and passengers for safety and ensuring that they are fit for duty in accordance with CASRs

ix. performing aviation-related tasks in accordance with aviation SOPs and WHS requirements

x. recording and maintaining records of operational data relevant for flight tracking and invoicing

xi. participating in post-mission administration and reporting internally within the contractor's organisation.

b. He or she must be able to:

i. have a working knowledge of the requirements of an aerial inspection and the skills required to fly the aircraft to the appropriate legal and safe standards to facilitate the aerial inspection

ii. conduct pre-mission activities including assessing the aircraft's airworthiness and the fitness for duty of the crew

iii. assess aviation-related risks in accordance with CASRs, SOPs, his or her organisation's safety management system and any other relevant rule, regulation or advisory

iv. assist the mission commander with the planning of flight routes for aerial inspections

v. monitor the in-flight conditions relevant to the safety of flight and make operational decisions to maintain safe and legal flight

vi. operate, cooperate and communicate as a member of the aviation team and communicate any issues to the mission commander

vii. communicate any relevant mission or operational issues, risks, considerations to his/her management that pertain to the aerial inspection mission or the campaign in general

viii. provide feedback to the mission commander as part of the post-mission debrief for lessons learnt

ix. decide what aviation-related tasks are required to be executed that are in accordance with SOPs and WHS requirements.

c. He or she is enabled by:

i. training and licence endorsement for low level flight and have the appropriate experience to safely conduct low level flight in accordance with the agreed contract performance levels

ii. training in the relevant skills as per the contracted agreement which may include such things as Crew/Team Resource Management or other human factors training; flying at low level in a hazards environment or other low level flying course training; Helicopter Underwater Escape Training (if required by contract) and other relevant courses as required by contract

iii. an understanding of the nature of data being collected as part of the aerial inspection campaign

iv. an understanding of risk management concepts relating to aerial inspection tasks

v. an understanding of environmental, physical, physiological and psychological factors that affect aviation operations

vi. an appropriate level of maintenance training to determine aircraft airworthiness and to support ground operations such as refuelling

vii. relevant aviation briefings and briefings by the client on operational requirements.

3.3.18 Ground support personnel. Ground support personnel are normally supplied by the contractor to assist the airborne team complete its tasks.

a. His or her role includes:

i. assessing and owning the risk for ground support operations

ii. refuelling and maintaining the aircraft to the extent of his or her licencing

iii. provide limited logistical support to the airborne aerial inspection team.

b. He or she must be able to:

i. Conduct ground support operations such as refuelling, maintenance (up to the level of licencing), administrative tasks and other tasks that support the airborne team

ii. conduct operational support tasks as required such as maintaining a SARTIME or providing HLS security as required

iii. maintain and operate ground support equipment.

c. He or she is enabled by:

i. the contractor's internal induction and training program as per the contractor's Air Operations Certificate

ii. relevant authorised training in ground support operations and/or maintenance (maintenance personnel only) which may include such things as Air Radio Operator, vehicle licencing, fuelling operations and other such licences and endorsements.

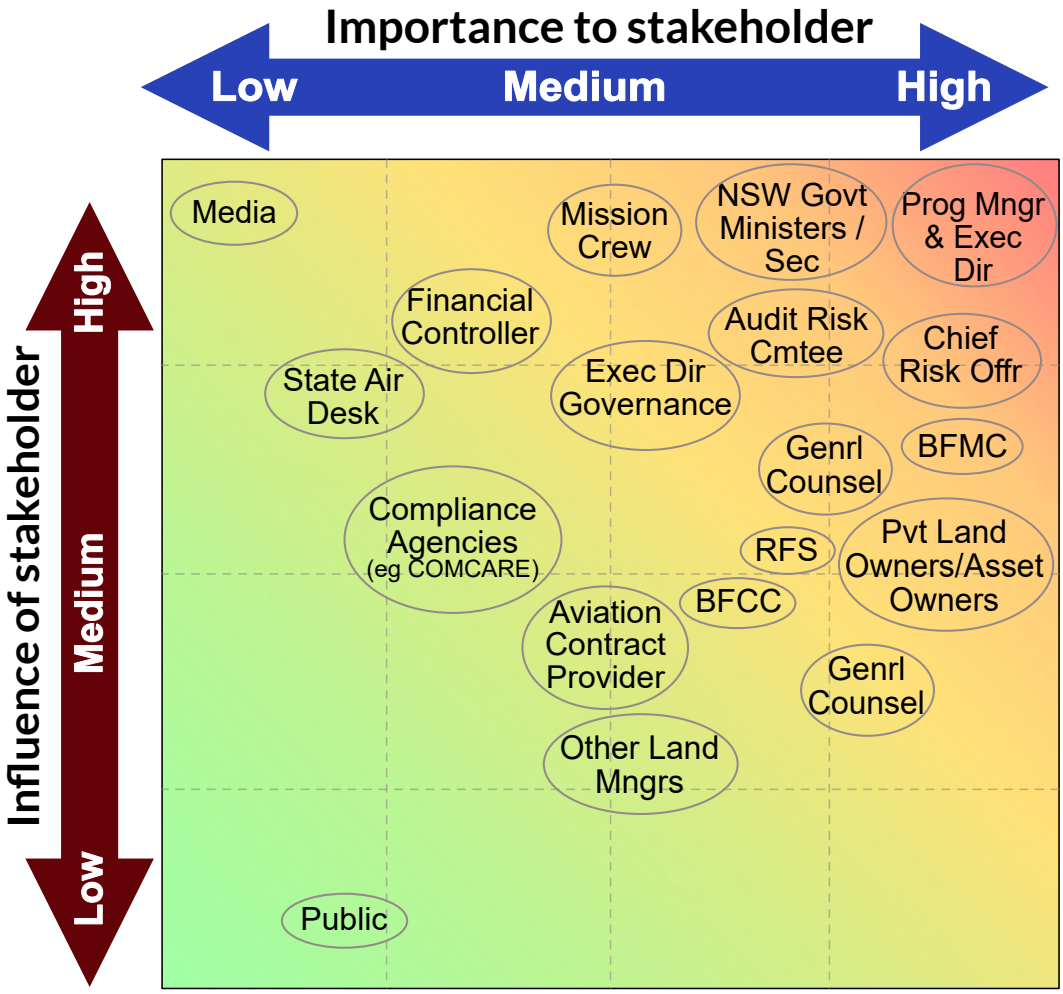
3.4.3 Key Performance Indicators. In order to ensure that targeted outcomes are met and that risk management processes are monitored and updated, a set of key performance indicators (KPIs) may be necessary. They are:

- team members are trained to a standard acceptable to the aerial inspection program manager or other member of Crown Lands suitably qualified to assess the training of personnel for this task, and understand their role within the mission crew
- team members are physically, mentally and emotionally ready to undertake their tasks as part of the aerial inspection
- the contracted aviation service provider has provided an aircraft suitable for the task and in accordance with agreed provisions of the contract or other suitable agreement including a pilot with the appropriate qualifications and knowledge of the task and other crew with the appropriate qualifications and knowledge of the task
- the aircraft is ready at the agreed time and performs as expected for the task
- the aircraft is flown to the required standard, in accordance with the CASRs and MOS and within the aircraft's operating limits and mission crew's operating limits and comfort level.
- the weather was as forecast and suitable for the task (ie visibility/wind/ light were appropriate for the aerial inspection as VMC or better)
- tablet and other equipment used to gather information was supplied and worked as expected
- the program gathered and collated the information from the crewmember and supplied it as an output in the correct format
- briefings and debriefings were carried out with information being passed and analysed effectively
- reporting of operational information (including risks, etc) was completed effectively upwards and downwards.

Crown Lands Risk Management

Stakeholder matrix

The decisions made as part of DPE Crown Lands' aviation risk management process are influenced by various stakeholders. These stakeholders, in turn, have a vested interest in what decisions are made in relation to Crown Lands' aerial inspection campaign and individual missions. The matrix below shows their positions in relation to their influence and the importance of decisions made and outcomes produced.



Section 3.4: External context - Other agencies and stakeholders

3.4.1 **A team within a team.** DPE does not work in isolation. It is a team within a team within a team. Its work is important to the NSW Government and the people of the state. It must be conducted in accordance with policy so that resources such as human capital, financial capital and assets are not wasted, destroyed or damaged. Furthermore, the information gathered by DPE programs is used by other agencies and stakeholders and so is of importance to them, also.

3.4.2 NSW Government risk policy requires that any risks that may be encountered in the activities of a department that may have an impact on other agencies are formally communicated to those agencies.[1] The Bush Fire Management Committees are examples of how other agencies may be impacted and their reactions and expectations may be at odds with those of the DPE. For example, the *Final Report of the Bushfire Inquiry 2020* stated that:

> ***"...the statutory objectives of BFMC members and the interests of landholders are sometimes in tension with each other. For example:***
>
> ***•The NSW RFS is responsible for protecting the community from, and reducing the risk of, fire***
>
> ***•Forestry Corporation is responsible for growing, protecting and harvesting a commercial timber supply and maximising the net worth of the State's investment***
>
> ***•NPWS is responsible for conserving and protecting wildlife, wilderness areas, wild rivers, Aboriginal objects and Aboriginal places***
>
> ***•Private landholders are generally focussed on trying to use their land for commercial and/or lifestyle purposes.***
>
> ***The inquiry has heard that the ability of BFMCs to manage these tensions and achieve their fire risk management objectives is highly variable, with some held up as exemplary and others requiring a lot of improvement. For example, the Lower Hunter BFMC has demonstrated that strong inter-agency collaboration can lead to improved fire trail management."***[2]

While the nature of DPE fire trail aerial inspections has inherent risks in it, at the tactical/operational level that risk is not normally shared by other agencies. At the strategic level however, the key risks to other stakeholders are:

- no aerial inspection data could impact maintenance and access planning
- an incident/accident will have an impact on the management and governance within the department.

Other risks to other stakeholders will exist, but the importance of those stakeholders in the decision-making process is limited as is their influence. Where it does have an impact, DPE is required to inform, and be informed, of the impact.[3] A further risk assessment may be necessary.

3.4.3 **External stakeholders.** The diagram in the infographic at the head of this

section is a stakeholder matrix showing the range of stakeholders that have an interest in the DPE fire trail aerial inspection program either in its outcomes or its execution, and their roles and responsibilities. It shows two dimensions: the influence of the stakeholder on the aerial inspection campaign and the importance to the stakeholder from either an outcomes point of view (ie the information is important) or from a responsibility point of view (ie the responsibility charged to the person or agency by the state and people of NSW).

External Stakeholder Matrix (from highest importance/highest influence)[4, 5]

3.4.4 Program Manager and Program Coordinator - ensures appropriate resources are assigned to the campaign so that risks are managed effectively. S/he ensures that risk information and the appropriate risk register is maintained to an acceptable standard. This person has the authority to allocate resources and an in-depth knowledge of the task/activity.

3.4.5 Executive Director/Director - The Executive Director/Director have overall responsibility for the management of the directorate/agency and, as such, are accountable for the maintenance of effective internal controls which includes risk treatment plans.

3.4.6 NSW Government Ministers/Secretary - The Minister is responsible to the Premier for activities within his/her portfolio. Likewise, the Secretary is responsible to the Minister for the management of the Department. Both have high influence and hold the management of the activity as being of high importance. They are required to provide leadership and support for effective risk management which includes a positive risk culture and what level of risk the department is willing to take.

3.4.7 Audit Risk Committee - The ARC has a range of responsibilities as set out in its charter, but most relevant is their responsibility to review whether management has in place a current and appropriate risk management framework.

3.4.8 Chief Risk Officer (Dept) - Designs the DPE Risk Management Framework and is responsible for the day-to-day activities associated with coordinating, maintaining and embedding the framework in DPIE and reporting to the Audit and Risk Committees and other committees as required.

Coordinates continuous improvement of the DPE Risk Management Framework through a strategic risk management plan.

3.4.9 **Mission Crew** - Their role in the decision-making process is through daily, tactical assessments of risk, instigating controls and then executing plans. They must have a working knowledge of risk management SOPs for their agency and the department and the ability to make sound operational/tactical decisions based on information available. Decisions made about the program will affect them. Likewise, their decisions will have a bearing on the outcomes of the program.

3.4.10 **Executive Director, Governance** - Responsible for resourcing the DPE risk management framework and accountable for its fit-for-purpose design. Reports to and advises the Secretary, Audit and Risk Committee and senior executives on risks, controls and treatment plans.

3.4.11 **General Counsel** - The General Counsel is the executive sponsor for departmental risk management as a whole.

3.4.12 **Bush Fire Management Committees** - The BFMCs rely on the data and information derived from the DPE aerial inspection program. Their allocation of resources to trail maintenance will be informed by the aerial inspection, therefore the importance of the outcomes of the aerial inspection program and its associated risks is high, while their influence on the program is only medium to high.

3.4.13 **Financial Controller** - The comptroller has a vested interest in the program in ensuring that value for money is obtained and that funds will be made available for future programs. His/her influence is high but the importance of the program to him/her is somewhat lower.

3.4.14 **Rural Fire Service** - the *Rural Fires Act* is the instrument that requires an aerial inspection of fire trails with the RFS Commissioner maintaining overall responsibility. On occasions, RFS personnel may accompany DPE personnel on the aerial inspection as part of inter-agency cooperation. To that end, the RFS' influence on the aerial inspection program is rated as medium and the importance of the aerial inspection is medium to high.

3.4.15 **Private Land Owners and Asset Managers** - These stakeholders have a vested interest in trails that are maintained and that provide access for fire fighting personnel and equipment, therefore the aerial inspection program's outputs are of importance to their planning though their influence is lower.

3.4.16 **Media** - The media and its influence on public opinion has a direct impact on the premier, minister and executive decision-making thus making their influence high while at the same time, the importance of the aerial inspection program to the media remains low.

3.4.17 **Bush Fire Coordinating Committee** - The BFCC oversees the BFMCs and answers to the RFS Commissioner. Its influence is medium but the importance of the aerial inspection providing information to the BFMCs is slightly greater.

3.4.18 **State Air Desk** - The aviation SOPs and the aviation contract provider are overseen by the NSW State Air Desk (SAD). Their influence on the Aerial Inspection campaign is at the operational level but the importance of the outputs of the aerial inspection is limited insofar as it pertains to fire fighting activities and how aviation operations may be affected, which exists but remains low. Aviation contracting is not conducted through the SAD.

3.4.19 **Compliance Agencies** - Agencies external to the department that oversee Commonwealth legislation will have an interest in decision-making within the department when it pertains to workplace health and safety and any investigations that may arise. The importance of decision-making is low, but their influence is medium.

3.4.20 **Aviation contract provider** - The contracted aviation organisation that supplies aircraft and aircrew have a vested interest in being contracted to provide the service. At the tactical level the provider has a vested interest in the decision-making prior to and during missions. The pilot in command (the aircraft commander) will work with the mission commander to ensure that all required information is available from which to make tactical decisions. Their position on the importance vs influence matrix reflects their interests in the program and in the individual missions.

3.4.21 **Other Land Managers** - There are other stakeholders who will be interested in the outcomes of the aerial inspection campaign but who may have very low influence on the campaign itself. These might include local governments, national parks and forestry services, etc.

3.4.22 **Public** - The public has influence as far as interest groups, opinion polls and voting extends. The importance of the outcomes is as great as the importance of the integrity of the state's public lands and bush fire mitigation strategies extend.

Section 3.5: Outputs of the fire trail aerial inspection

3.5.1 Strategic, operational and tactical mission contexts. As part of a risk management plan, it is useful to determine the contexts of the annual aerial inspection at various levels and what outputs are expected from individual missions, operational campaigns and strategic planning. By knowing how each activity nests within the next activity higher up assists operators in understanding the requirements and expectations of a mission.

a. **Strategic outputs** - at the strategic (ie Departmental and State Executive) level the aerial inspection of fire trails, either by surface or by air, informs and facilitates the execution of responsibilities required by the *Rural Fires Act* of the various government agencies to classify and maintain an integrated fire trails network in order to mitigate the risks associated with bush fires.

Fire trail maintenance. Aerial Inspections of fire trails help to inform decision-making in their maintenance and upgrade to help mitigate the effects of bush fires. Image from

i. the targeted output is informed decision-making leading to a fire trail maintenance plan to be undertaken by various state agencies at various levels and the assurance of appropriate future resourcing

ii. the targeted outcome is a well maintained integrated system of fire trails across the state that is maintained within the allocated resources that help in the mitigation and suppression of bush fires.

b. **Operational outputs** - the key outcomes of the DPE fire trail aerial inspection program is the coordinated, safe and efficient tasking of DPE personnel and contracted aviation providers throughout the aerial inspection program in order to gather data to inform the FAFT plans so that state's fire trails can be classified and maintained to meet required standards.

i. The targeted output is data transformed into information that assists the various bush fire committees to create FAFT plans and for maintenance

ii. The targeted outcome is an aerial inspection campaign that is conducted safely, with risk miminised at all levels resulting in no significant incidents or accidents, and conducted efficiently with the minimum wastage of resources.

c. **Tactical outcomes** - the key tactical outcome of a DPE aerial fire trail inspection flight is the safe and efficient completion of an aviation mission in order to gather specific data on the condition of a specific fire trail.

i. The targeted output is the collection of data by air for analysis in a useable format that can be converted into information for stakeholders so that trails can be maintained.

ii. The targeted outcome is a successful inspection flight that is conducted safely with risk miminised at all levels resulting in no significant incidents or accidents, and conducted efficiently with the minimum wastage of resources.

Fire trails and their characteristics

3.5.2 Categorisation and classification of fire trails. The successful aerial mission gathers data to aid in classifying fire trails. The NSW RFS dictionary defines the terms used when referring to fire trails and their characteristics and are used as part of the fire trail standards. The full definitions can be found in the standards.[1] In summary, they are:

- **Designated fire trail** - a fire trail that must be established or upgraded in order to meet the *Standards*
- **Certified fire trail** - a fire trail that is compliant with the *Standards*
- **Registered fire trail** - a certified fire trail that has been placed on the Public Register (regardless of land tenure)
- **Strategic fire trail** - a fire trail of significant value in the suppression or management of fire within the landscape
- **Tactical fire trail** - a fire trail that should remain open to support the suppression or management of fire within the landscape
- **Category 1 fire trail** - a fire trail that can be safely traversed by a Category 1 firefighting vehicle
- **Category 7 fire trail** - a fire trail that can be safely traversed by a Category 7 firefighting vehicle
- **Category 9 fire trail** - a fire trail that can be safely traversed by a Category 9 firefighting vehicle.

Two examples of fire trails: one well maintained and one suffering from erosion.
(Image by Soil Conservation Service's NSW RFS Fire Trail Manual)

3.5.3 Requirements for fire trails. Each category of fire trail has specific requirements. It is ensuring that these requirements are met which forms the basis of the aerial inspection. The data gathered from ground or aerial inspections will inform the BFMCs and their FAFTs to help categorise the fire trails in their areas of responsibility. The *Standards* provide the requirements, performance criteria and acceptable solutions to meet the standards and each category of trail will vary. The requirements are listed in detail in the *Standards*. Readers are directed to the *Standards* for the precise figures required, however, as a general indicator of what information is being sought, the following summary provides approximations:

A Category 1 firefighting vehicle
(Image by Soil Conservation Service's NSW RFS Fire Trail Manual)

Category 1 Trail - able to be traversed by a Category 1 firefighting vehicle (mid-sized crew cab truck approx 8.2 m long, 2.4 m wide, 3.7 m high)

- Width - able to accommodate a Cat 1 truck. Normally 4 m in width and a turning radius of 6 m
- Capacity - trail and crossings can carry 15 t vehicles
- Grade and crossfall - capable of accommodating the safe working limits of a Cat 1 truck, but approximately 15 degrees of grade, 6 degrees of crossfall
- Clearance - allows for unobstructed passage, but normally 4 m vertical clearance
- Passing - allows for Cat 1 vehicles to pass at appropriate intervals around every 250 m with dimensions as listed in the *Standards*
- Turnarounds - allow for turning manoeuvres of Cat 1 vehicles at the termination of the trail and every 500 m
- Drainage - in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*

Category 7 Trail - able to be traversed by a Category 7 firefighting vehicle (mid-sized crew cab truck approx 6.2 m long, 2.0 m wide, 3.0 m high)

- Width - able to accommodate a Cat 7 truck. Normally 3.5 m in width and a turning radius of 5 m
- Capacity - trail and crossings can carry 8 t vehicles
- Grade and crossfall - capable of accommodating the safe working limits of a Cat 7 truck, but approximately 15 degrees of grade, 6 degrees of crossfall
- Clearance - allows for unobstructed passage, but normally 3.5 m vertical clearance
- Passing - allows for Cat 1 vehicles to pass at appropriate intervals around every 250 m with dimensions as listed in the *Standards*
- Turnarounds - allow for turning manoeuvres of Cat 7 vehicles at the termination of the trail and every 500 m
- Drainage - in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*

A Category 7 firefighting vehicle
(Image by Soil Conservation Service's NSW RFS Fire Trail Manual)

Category 9 Trail - able to be traversed by a Category 9 firefighting vehicle (4WD trayback approx 5.3 m long, 1.8 m wide, 2.6m high)

- Width - able to accommodate a Cat 9 vehicle. Normally 3 m in width and a turning radius of 5m
- Capacity - trail and crossings can carry 4 t vehicles
- Grade and crossfall - capable of accommodating the safe working limits of a Cat 9 truck, but approximately 15 degrees of grade, 6 degrees of crossfall
- Clearance - allows for unobstructed passage, but normally 3 m vertical clearance

- Passing - allows for Cat 9 vehicles to pass at appropriate intervals around every 250 m with dimensions as listed in the *Standards*
- Turnarounds - allow for turning manoeuvres of Cat 9 vehicles at the termination of the trail and every 500 m
- Drainage - in accordance with the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*

A Category 9 firefighting vehicle
(Image by Soil Conservation Service's NSW RFS Fire Trail Manual)

3.5.4 Fire trail characteristics. In order to ensure consistency in understanding by all members of the aerial inspection team, and to assist those who are unfamiliar with fire trail design and maintenance standards, the following paragraphs and images may assist.

3.5.5 Fire trails provide access for vehicles, therefore the key characteristics of a fire trail must be looked at with a regard to how a vehicle will be able to use it and how long the trail is likely to be in use and the construction standards to ensure its longevity and its protection from vegetation growth and the effects of the weather and erosion. Fire trails are defined, usually, by their cross-sectional shape as outlined in the diagram below.

3.5.6 Fire trail terminology. Fire trail terminology is centred around critical widths and drainage typologies.

- Carriageway width is the width of the trafficable surface. The surface is usually mineral earth but provided it does not impede the vehicle's ability to use the trail, it can be grass or small plants.
- Formation width is the total width of the trail that includes the carriageway, shoulders, verges and drains.
- Road Corridor width is the full extent of the cleared corridor that was required to construct the fire trail. It includes the cut, fill batters, any catch drains, mitre drains, turning and passing bays.

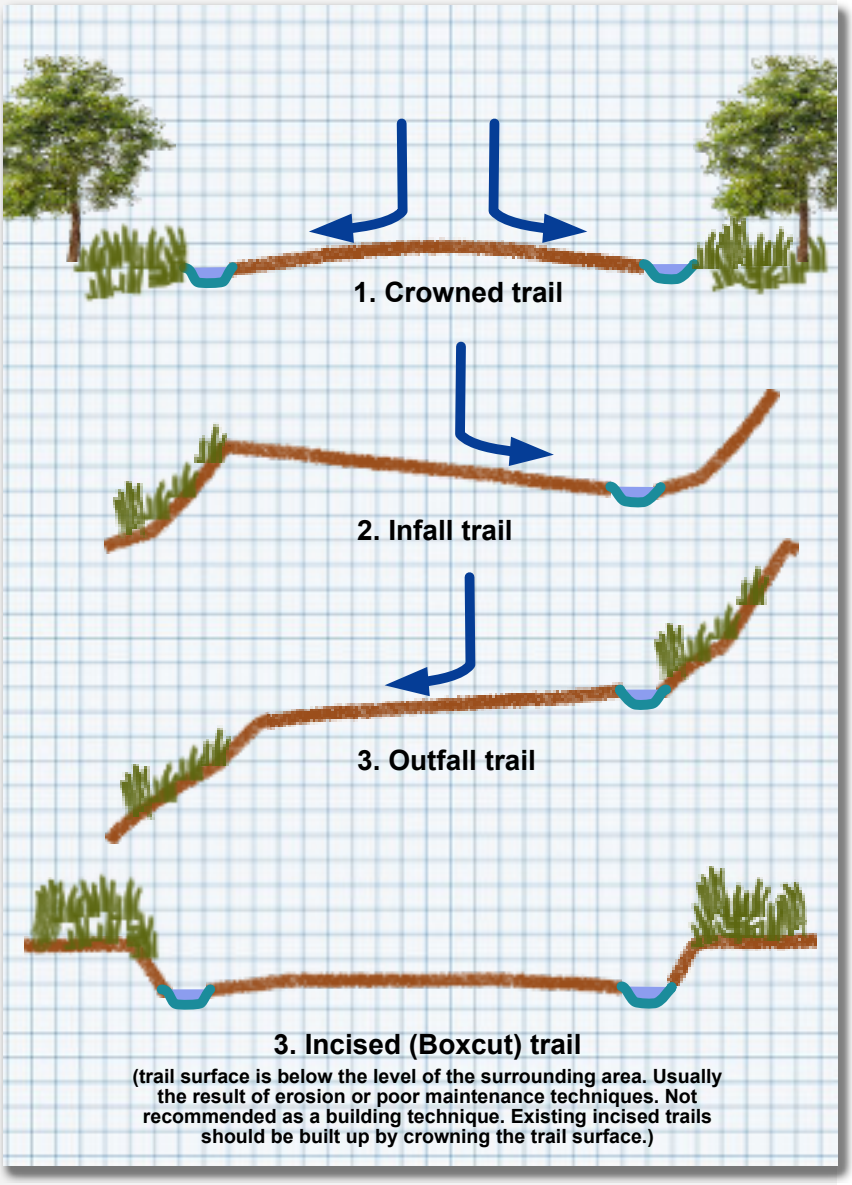
Conduct of the aerial inspection

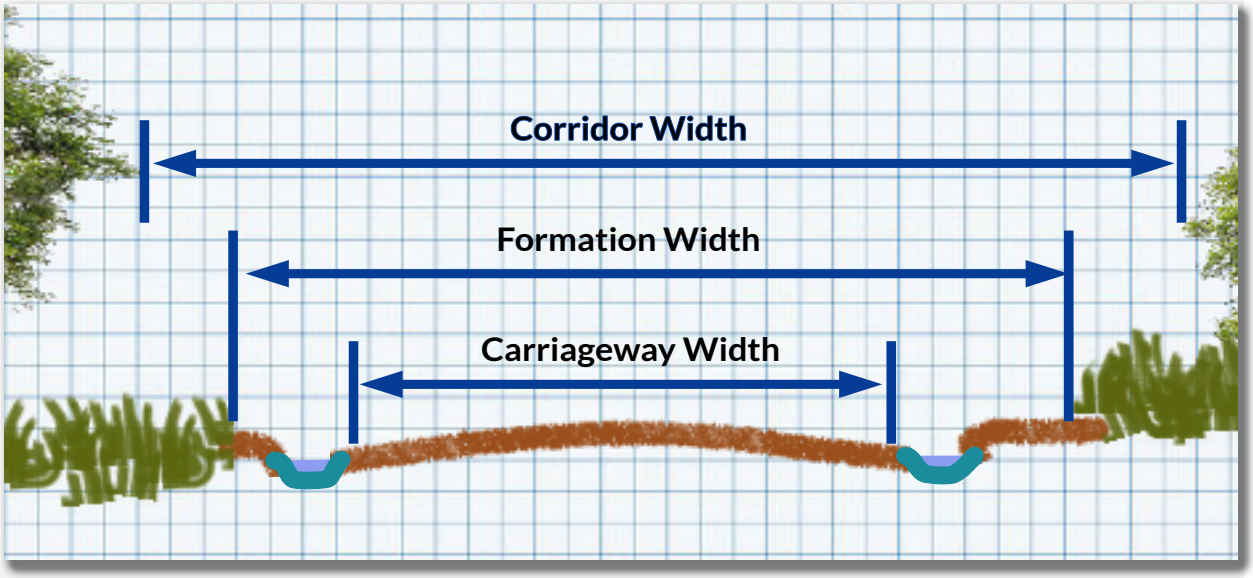
3.5.7 Flight profile. To effectively identify fire trails and their characteristics and any issues that may need rectification, the observers need to be located above the trail at approximately 100 to 300 feet. Ideally the pilot will position the aircraft such that the mission commander in the front left seat can easily look down through the canopy and along the longitudinal axis of the trail. This may require the aircraft's heading to be offset from the aircraft's track by around 20 to 30 degrees and flown at around 30 knots.

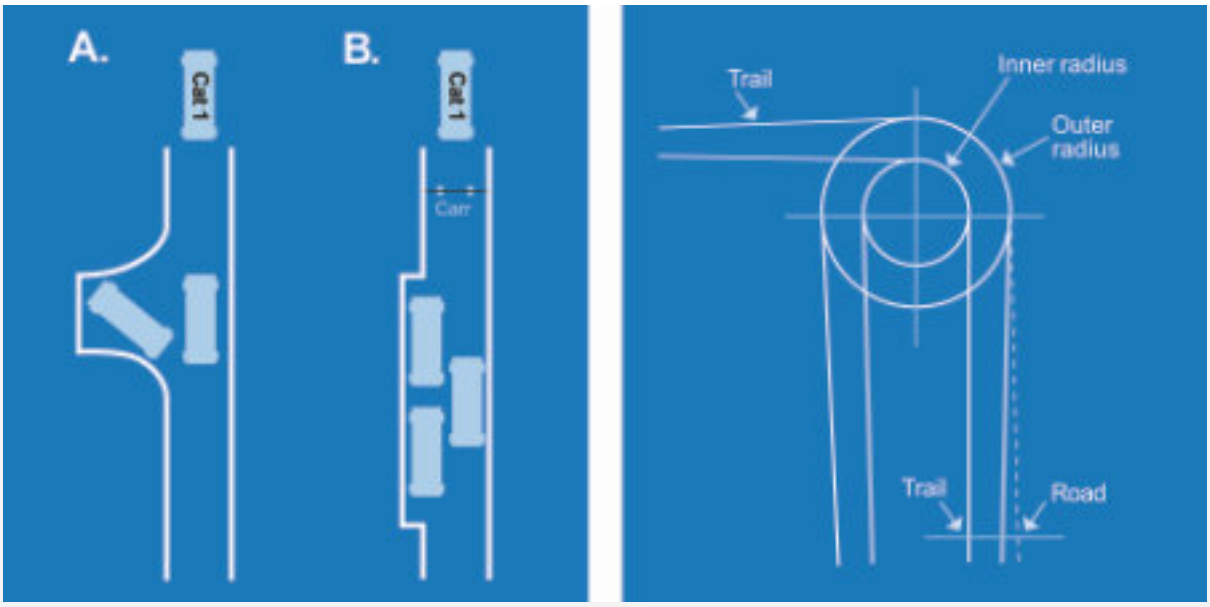
Fire trails are defined by their cross-sectional shape as shown in the diagram at right.

Terminology on the trafficable widths of fire trails are shown below.

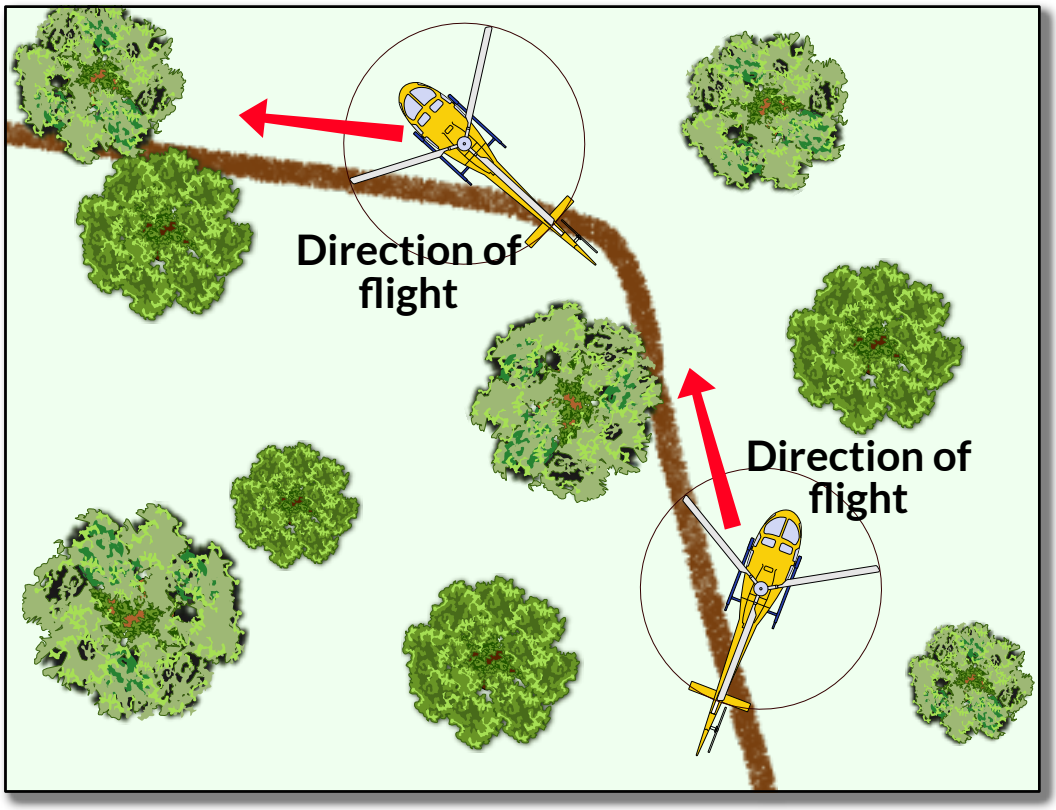
(Images by Conway Bown as derived from the NSW RFS Fire Trail Design, Construction and Maintenance Manual).







Above. Fire trails require passing bays and turning bays dependent on the category of vehicle/trail. Below. A well formed fire trail with longitudinal table drains and a cross bank allowing upslope water to drain across the trail with the minimum of erosion.
(Images from NSW RFS Fire Trail Design, Construction and Maintenance Manual)



In order to get the best view through the tree canopy, the pilot may need to fly the aircraft offset from the aircraft's track as shown in the diagram above and as demonstrated in the picture of the mission commander assessing a fire t rail from the front left seat below.
(Images by Conway Bown)

Above: The observer in the right rear seat records the information gathered by the MC and the AOB using a data collection application installed on a tablet (below right).The output is collated into a spreadsheet (below) which provides the information that aids in decision-making on the prioritisation of works and maintenance of the State's fire trails.
(Images by Conway Bown (above) and supplied by Crown Lands (right and below)).

Aviation Documents

The tiers of Australian aviation rules

Tier 1

CIVIL AVIATION ACT 1988 / AIRSPACE ACT 2007

- Approved by parliament and are enforceable

Tier 2

**CIVIL AVIATION REGULATIONS 1988 /
CIVIL AVIATION SAFETY REGULATIONS 1998**

- Delegated legislation
- Rules of conduct, standards and other requirements of general application that must be met.
- CASRs are gradually replacing CARs
- Approved by parliament
- Enforceable

Tier 3

MANUALS OF STANDARDS (MOS)
CIVIL AVIATION ORDERS (CAOs)
AIRWORTHINESS DIRECTIVES (ADs)

- Delegated legislation
- Technical standards and other requirements that must be met in order to comply with the regulations and/or qualify for a licence, certificate, permission or other authorisations
- Approved by parliament
- Enforceable

Supporting Material

CIVIL AVIATION ADVISORY PUBLICATIONS (CAAPs)
ADVISORY CIRCULARS (ACs) MANUALS ETC

- Advisory publications, manuals, checklists
- Provides advice and explains one or more ways to comply with the regulations, but are not compulsory to follow
- Not approved by parliament
- Not enforceable

Section 3.6: Aviation rules and regulations

Commonwealth rules

3.6.1 Overarching rules and regulations. Aviation operations are strictly governed by Civil Aviation Safety Regulations (CASRs), an aviation Manual of Standards and other instruments that maintain safety within the aviation industry. The National Aviation Authority (NAA) is the Civil Aviation Safety Authority (CASA) and it is charged with overseeing aviation within Australia. In conjunction with AirServices Australia, the organisation that manages airways, navigation equipment, briefing platforms, and other services, the two organisations are governed by the *Civil Aviation Act 1988* and *Airspace Act 2007* respectively and provide aviation operations with a regulatory framework and the tools required for safe flight. Key Commonwealth aviation rules and regulations that pertain to aerial inspection campaigns are:

- Visual Flight Rules (VFR)
- Civil Aviation Safety Regulations (currently replacing Civil Aviation Regulations [CARs])
- Civil Aviation Advisory Publications (CAAPs).

The diagram at left provides an overview of the Australian aviation hierarchy of aviation documents. Those that are enforceable by law are so indicated.

Subordinate Rules

3.6.2 Aviation operators. The contracted aviation organisation that provides the aircraft and pilots and other support personnel are required by law to have an operations manual and to abide by CASRs. The operations manual is reviewed and approved by CASA and will outline the methods to be used for various types of operations, including low-level aerial inspection. It is a requirement of all who travel in the aircraft of an aviation organisation to abide by the approved and authorised procedures outlined in the organisation's operations manual.

3.6.3 Aerial work zones and risk assessments. CASRs require aviation operators to conduct a risk assessment as prescribed in the relevant MOS.[1] The risk management procedures outlined herein take into account these requirements. Aerial Work Zones (AWZs) can be summarised as zones that require special consideration because of the higher risk associated with working in that environment which may require specific approvals from the regulator. The risk may include such things as the likelihood of people or livestock being in the area, occupied buildings, critical infrastructure and such, and where there is a risk to the safety of people and property should an emergency arise and the aircraft or associated equipment can not be assured of not causing injury or damage. For example, a helicopter working in a city lifting a heavy air conditioning unit onto a building would require an aerial work zone and associated risk mitigations.[2] For most aerial inspection work carried out in the support of fire trail aerial inspections, an AWZ is unlikely to be required, however confering with the pilot and operator will help to determine if an AWZ is likely to be needed.

3.6.3 Other aviation rules. The NSW state government agencies are required to be familiar with *NSW Aviation Standard Operating Procedures* (SOPs). SOPs allow for standardisation across branches and agencies and help to reinforce higher-level regulations and reduce confusion while increasing efficiencies. Within departments, aviation rules may also apply but will not normally relax the SOPs. Nothing in the SOPs relieves any member of a NSW Government agency from their responsibilities under legislation and/or regulation.[3]

Operational Rules

3.6.3 Visual Flight Rules. Aerial inspection campaigns will be conducted in visual conditions. These are known as VMC - visual meteorological conditions. Pilots are required to fly within certain rules within VMC. These rules are called Visual Flight Rules (VFR) and take into account the capabilities of aeroplanes and helicopters and the environmental conditions, thus they have some slight differences between the two aircraft types. Because helicopters can slow down and land almost anywhere, their weather limitations are much more generous as those for fixed-wing aircraft. These will be outlined in Section 4 - Risk Assessment.

3.6.4 Flight planning. The pilot in command of an aircraft conducting aerial work operations and who has operational control for the flight must avail him/herself to the required information that is reasonably available before and during flight.[4] This information must include the authorised weather forecasts and reports in relation to the flight and the NOTAMs for the flight[5] and must be reviewed within the hour prior to the flight.[6] If weather forecasts/reports are not available, then the pilot may decide to commence the flight provided he or she reasonably considers that the departure aerodrome will permit the aircraft to return and land safely within one (1) hour after takeoff.[7]

3.6.5 Minimum altitude rules. The minimum altitude allowed to be flown depends on a number of factors as outlined in the CASRs, namely:

- the nature of the task which will determine the regulations that apply
- whether the flight will take place over a populated area or an unpopulated area
- the horizontal distance from people, animals and buildings
- the qualifications of the pilot
- the permissions of the operator
- the weather conditions

As with the minimum meteorological conditions mentioned above, they will be outlined in the next chapter where specific risks are examined and evaluated.

Part 3 Endnotes

Section 3.1

1. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, p 5.
2. NSW Government, *TPP 12-03b Risk Management Toolkit for NSW Public Sector Agencies: Vol 1*, NSW Treasury, Sydney, 2012, p 1
3. NSW Government, *TPP 12-03b Risk Management Toolkit for NSW Public Sector Agencies: Vol 1*, p 44 - 46

Section 3.2

1. NSW Government, *Final Report of the NSW Bushfire Inquiry*, Department of Premier and Cabinet, Sydney, 2020, para. 4.5.2
2. NSW RFS website, https://www.rfs.nsw.gov.au/plan-and-prepare/fire-trails/fire-trail-register accessed 21 Feb 22.
3. NSW Government, *Bushfire management on Crown land - Fact Sheet*, DOC200005426, NSW DPE, Sydney, date unk, p.1.
4. NSW Government, *Rural Fires Act 1997 No 65*, s. 62V & W
5. NSW Government, *Final Report of the NSW Bushfire Inquiry*, Department of Premier and Cabinet, Sydney, 2020, para. 1.1.
6. NSW Government, *Final Report of the NSW Bushfire Inquiry*, Department of Premier and Cabinet, Sydney, 2020, para. 4.5.2.
7. NSW Government, *Bushfire management on Crown land - Fact Sheet*, DOC200005426, NSW DPE, Sydney, date unk, p.2.
8. NSW Government, *NSW Rural Fire Trail Standards 2016 V1.1*, NSW RFS, Sydney, 2016, para. 3.2.
9. Personal communication, Conway Bown with George Schneider (DPE) and Scott Vale (DPE).
10. NSW Government, *Bushfire management on Crown land - Fact Sheet*, DOC200005426, NSW DPE, Sydney, date unk, p.1.
11. NSW Government, *Bushfire management on Crown land - Fact Sheet*, DOC200005426, NSW DPE, Sydney, date unk, p.1.
12. NSW Government, *NSW Rural Fire Trail Standards 2016 V1.1*, NSW RFS, Sydney, 2016, para. 1.2.
13. NSW Government, *Bush Fire Management Committee Handbook*, Bush Fire Coordinating Committee, Sydney, 2020, p.10.
14. NSW Government, *Rural Fires Act 1997 No 65*, s. 62K.
15. NSW Government, *Final Report of the NSW Bushfire Inquiry*, Department of Premier and Cabinet, Sydney, 2020, para. 4.5.2.2.
16. NSW Government, *Final Report of the NSW Bushfire Inquiry*, Department of Premier and Cabinet, Sydney, 2020, para. 4.5.2.5.1.

Section 3.3

1. Civil Aviation Safety Authority, *Civil Aviation Safety Regulations 1998 Compilation No 93*, CASA, Canberra, 2021, Definitions
2. Civil Aviation Safety Authority, *Civil Aviation Safety Regulations 1998 Compilation No 93*, CASA, Canberra, 2021, Definitions
3. Civil Aviation Safety Authority, *Civil Aviation Safety Regulations 1998 Compilation No 93*, CASA, Canberra, 2021, s. 138.015
4. Civil Aviation Safety Authority, *Part 138 (Aerial Work Operations) Manual of Standards 2020*, Canberra, 2020, s. 25.02 (1)
5. Civil Aviation Safety Authority, *Part 138 (Aerial Work Operations) Manual of Standards 2020*, Canberra, 2020, s. 25.02 (2)
6. Civil Aviation Safety Authority, *Part 138 (Aerial Work Operations) Manual of Standards 2020*, Canberra, 2020, s 2.02
7. Civil Aviation Safety Authority, *Part 138 (Aerial Work Operations) Manual of Standards 2020*, Canberra, 2020, s 2.02 (2)
8. Civil Aviation Safety Authority, *Part 138 (Aerial Work Operations) Manual of Standards 2020*, Canberra, 2020, s25.02 (1) and the note.
9. NSW Government, *TPP 12-03b Risk Management Toolkit for NSW Public Sector Agencies: Vol 1*, NSW Treasury, Sydney, 2012, p 29 - 30.
10. Consultation with State Bushfire Coordinator and aerial inspection program owner as well as Senior Bush Fire Officer and aerial inspection coordinator through telecon and email from Jan 2022 through Jun 2022.

Section 3.4

1. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, para. 1.2.8.
2. NSW Government, *Final Report of the NSW Bushfire Inquiry*, Department of Premier and Cabinet, Sydney, 2020, para. 3.3.1.1.
3. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, para. 1.2.10.
4. NSW Government, *Risk Management Policy* - Department of Planning, Industry and Environment, DOC 20/589435, Vers 2, 2021
5. The information in this section is an amalgam of details from the DPIE (now DPE) Risk Management Policy (see previous reference) and the Perscom Conway Bown / George Schneider / Scott Vale to ensure that the placement of these stakeholders was appropriate in this scale.

Section 3.5

1. NSW Government, *NSW Rural Fire Trail Standards 2016 V1.1*, NSW RFS, Sydney, 2016 para 1.7.
2. NSW Government, *NSW Rural Fire Trail Standards 2016 V1.1*, NSW RFS, Sydney, 2016 paras 2.2.1 to 2.2.3

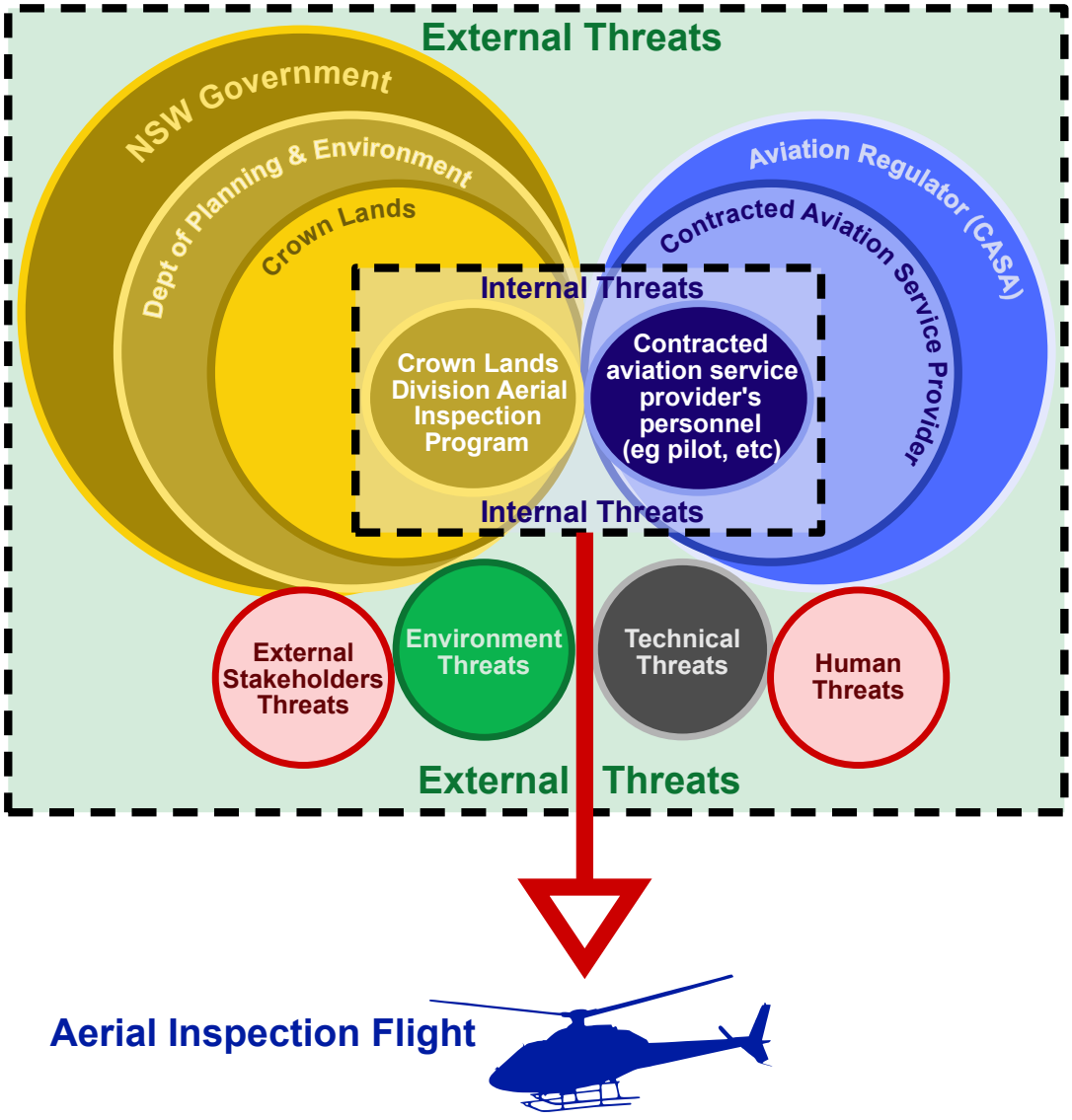
Section 3.6

1. Civil Aviation Safety Authority, *Advisory Circular AC 138-05 v1.1 Aerial work risk assessment*, (D21/267693), CASA, Canberra, 2021
2. Civil Aviation Safety Authority, *Part 138 (Aerial Work Operations) Manual of Standards 2020*, Canberra, 2020, s 1.03
3. NSW Rural Fire Service, *NSW and ACT Aviation Standard Operating Procedures, 2018 - Version 4.1*, NSW RFS, Sydney, 2018, sub section 2.2
4. Civil Aviation Safety Authority, *Civil Aviation Safety Regulations 1998 Compilation No 93*, CASA, Canberra, 2021, s. 138.270 (2)
5. Civil Aviation Safety Authority, *Civil Aviation Safety Regulations 1998 Compilation No 93*, CASA, Canberra, 2021, s. 138.270 (3)
6. Civil Aviation Safety Authority, *Part 91 (General Operating and Flight Rules) Manual of Standards 2020*, Canberra, 2020, s 7.02 (1A)
7. Civil Aviation Safety Authority, *Part 91 (General Operating and Flight Rules) Manual of Standards 2020*, Canberra, 2020, s 7.03 (1)

Crown Lands Risk Management

Internal and External Threats

The DPE Aerial Inspection Program and the individual inspection flights must negotiate internal and external threats in order for either to be a success. The threats could be from within the DPE inspection program itself, either the mission crew that flies the mission and/or the management that organises, coordinates and oversees the program, or the threats could be from outside that team in which case they would be external threats. External threats could include other parts of the organisation or other organisations, environmental threats, mechanical threats or human threats. The risk management process seeks to identify and mitigate against threats that pose a danger to mission success and which may result in a negative outcome.



Part 4: Risk assessment

Section 4.1: Risk contexts of aerial inspections

Note: For the purpose of this section, a threat and a hazard can be thought to be synonymous. Risk is the product of threats and exposure and likelihood.

4.1.1 What is the risk assessment process? If risk management is the coordination of activities to direct and control risk, then the risk assessment is that specific activity within risk management that consists of these three components:

- the identification of the risk of threats/hazards that may be encountered and their likelihood that they will have an impact on goals
- the analysis of the risks
- the evaluation of those risk prior to treating them.[1]

Threats (hazards) and events

4.1.2 Identifying and contextualising threats. Threats (or hazards) can be divided into internal and external contexts and where latent threats (hidden until discovered, but possible based on analysis), anticipated threats (predictable, known and probably likely to occur based on known conditions) and unanticipated threats (predictable unknown and possibly likely to occur) may arise. The nature of an aerial inspection means that the activities from commencement to termination can be put into phases and can be analysed based on historical data.

4.1.3 Events. An event is an occurrence or a change in a set of circumstances and can have one or several causal factors. In the context of a negative event, if no loss occurs it may be referred to as a 'near miss' or 'close call' or 'dangerous occurrence'. [2]

Risk contexts - internal and external

4.1.4 Threats and risks in the internal context. Threats that can be found within the organisation that may include such things as governance, policy, crew capabilities, relationships and other aspects of planning and conducting aerial inspections for the Crown Lands division by Crown Lands personnel. In this case, the fire trail aerial inspection team and the management and other support personnel that facilitate the inspection team doing its job within the Crown Lands division. Attached to the Crown Lands inspection team is the pilot, ground support personnel (eg the refueller) and, on occasion, members from other agencies that have a stakeholding in the output (eg air observers from NSWRFS or NPWS, etc).

4.1.5 Threats and risks in the external context. Threats that originate outside the organisation and which have an impact on the conduct of the campaign at the operational level and on the flights at the tactical level. It is the environment in which the organisation seeks to achieve its objectives. Examples of external threats may be inter-divisional friction or budgetary constraints or even physical threats such as bad weather or wildlife.

Any threat that does not originate from within the organisation can be considered an external threat.

Using the ATSB SIIMS Taxonomy for contextualisation

4.1.6 The ATSB SIIMS taxonomy. The Australian Transport Safety Bureau (ATSB) has developed an incident taxonomy based on an ICAO model (ADREP 2000)4 to classify aviation incidents as part of their investigative process and to increase the quality of the data and its searchability.[5] The Safety Investigation Information Management System — SIIMS — groups aviation incidents into five broad occurrence types, and then further divides them into sub-groups and sub-sub groups. The taxonomy is a useful model for organising, classifying and analysing internal and external threats.

4.1.7 Adapting the ATSB SIIMS taxonomy for NSW Public Sector and DPE operations. In order to use the ATSB SIIMS taxonomy, and to adhere to the first principle of risk management within the NSW Public Sector and core requirement 1.2 that the Accountable Authority of an agency shall ensure that his/her agency's risk management framework is appropriate for the agency, fit for purpose and tailored to the agency's needs while being consistent with AS ISO 31000:2018.[6] The following paragraphs look at overarching threats that occur in the internal and external contexts in order to create a taxonomy of threats for DPE operations.

4.1.8 The DPE Threat Taxonomy. The threats that are relevant to DPE aerial inspection operations can be categorised into threat origins and clusters and phases of the operation. This makes it convenient for analysis and for the risk management process. Threats may originate externally to the organisation as external threats (psychological and physical), or internally within the organisation and team as internal threats (psychological, physical and physiological).

4.1.9 DPE Threat Origins. As described above, the threats to DPE aerial inspection operations can be categorised as follows:

External Threats (Psychological)

- Non-compliance with CASRs/MOS by the contracted organisation
- Non-compliance with NSW Govt Policies and SOPs with regard to risk management and aviation management
- Inter-agency friction (identified as an issue 3.3.1.2 Bush fire inquiry)
- Contractee / contractor relationship and commercial pressures
- Contractor competency
- Crew competency
- Flight preparation
- External personnel unfamiliar with procedures
- Timeline/deadline pressures
- New priorities from external agencies
- Mission creep derived from external agencies.

External Threats (Physical)

- Environmental

    - Weather
    - Visibility
    - Wildlife
    - Terrain
    - Obstacles
    - Traffic
    - Airspace
- Technical
    - Aircraft reliability
    - Aircraft performance
    - Engine reliability
    - Communications equipment
    - Data capture equipment
- Human
    - Aircraft preparation
    - Accident mitigation
    - Survival

External Threats (Physiological)

- None identified

External Threats (Psychological)

- Perceptions of external stakeholders
- Priorities of external stakeholders
- Cultural differences between organisations
- Policies and objectives
- Financial constraints

Internal Threats (Physiological)

- Fatigue
- Visual acuity or vision problems
- Hearing problems
- Illness
- Intoxicants
- Spacial Disorientation/Motion Sickness

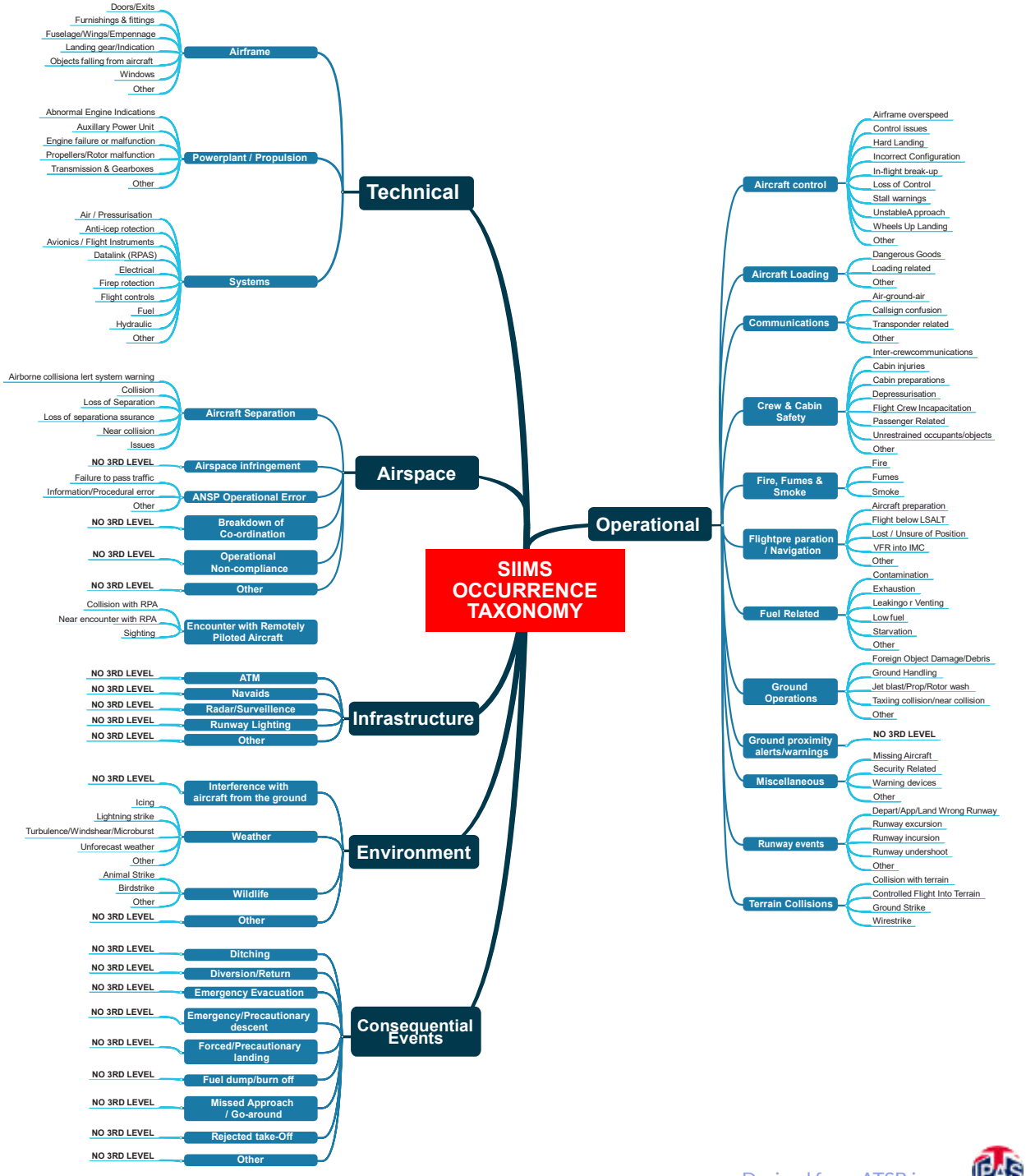
Internal Threats (Psychological)

- Internal policies

The ATSB SIIMS Taxonomy

A classification system for aviation incidents

The Australian Transportation Safety Bureau has created a taxonomy—a classification system—for aviation safety-related incidents based on six groups divided into 40 sub-groups and even more sub-sub groups.



Derived from ATSB image

- Inter-personal friction
- Crew competency
- Non-compliance with CASRs/MOS by DPE personnel
- Non-compliance with NSW Govt Policies and SOPs with regard to risk management and aviation management
- Crew competency
- Flight preparation
- Information flow
- Decision-making processes
- Timeline/deadline pressures
- New priorities from within the division
- Mission creep derived from internal pressures

Threat classes for DPE operations

4.1.10 DPE Threat Classes. To aid in analysis, the above threat origin categories can be further elaborated upon to create threat classes that may have their origins internal or external to the organisation. These classes form the basis of the SIIMS Taxonomy for DPE as derived from the ATSB's SIIMS taxonomy. The classes are as follows:

- **DPE Threat Class 1 - Planning and Coordination** - Any threat that emerges from the planning of the aerial inspection program and then from the coordination and oversight of the aerial inspection flights. This includes funding, contract negotiations, planning, crew training and staffing.
- **DPE Threat Class 2 - Operational** - Any threat that emerges from the physical use of the aircraft or operating in and around the aircraft on the ground or in the air.
- **DPE Threat Class 3 - Technical** - Any threat that is derived from the configuration of the aircraft or the components on the aircraft and may include malfunctions of components.
- **DPE Threat Class 4 - Airspace** - Any threat that is relevant to the coordination of flight through airspace and sharing that airspace with other users.
- **DPE Threat Class 5 - Environmental** - Any threat that emerges from the environment such as weather or animals.
- **DPE Threat Class 6 - Consequential Events** - Any threat that is the result of a mishap and the events that occur thereafter or threats that are the consequence of the flying of missions such as fatigue.

4.1.11 DPE aerial inspection campaign/mission phases. To further aid in analysis, the internal and external threats and their various classes can be viewed in the context of a phase of the mission. The phases can be arranged in more-or-less chronological order starting from before the campaign when contracts are being organised and staff are being trained, to the actual campaign itself and the individual flights. The campaign/mission phases are as follows:

- **DPE Aerial Inspection/Mission Phase 0 - Campaign planning** (incl training and inter-

agency/external stakeholder relationships and administration/management of campaign)

- **DPE Aerial Inspection/Mission Phase 1 - Pre-mission / Post mission activities** including the identification and recording of threats and risks and the post-mission or post campaign analysis of the activities.
- **DPE Aerial Inspection/Mission Phase 2 - Planning and Briefing** (incl Post Mission Debrief) for individual Aerial Inspection flights.
- **DPE Aerial Inspection/Mission Phase 3 - Aircraft and mission specific equipment preparation and loading for Aerial Inspection flights.**
- **DPE Aerial Inspection/Mission Phase 4 - Start / Taxi / Take off for a Aerial Inspection flight.**
- **DPE Aerial Inspection/Mission Phase 5 - Transit to the area of Aerial Inspection.**
- **DPE Aerial Inspection/Mission Phase 6 - Low Flying / Aerial Inspection Phase.**
- **DPE Aerial Inspection/Mission Phase 7 - Approach / Landing /Off Site Landings or return to base.**
- **DPE Aerial Inspection/Mission Phase 8 - Refuelling and other ground maintenance activities.**

Section 4.2: Risk criteria

Risk Criteria

4.1.4 Defining risk and risk criteria. Risk is the effect of uncertainty on objectives and can be a deviation from the expected, either positive or negative. Risk criteria is, according to ISO risk vocabulary, the terms of reference against which the significance of a risk can be evaluated. [1]They can be contextual, and are derived from standards, laws and policies. To explain risk criteria in a simple way, consider the consequences of a hazard turning into a negative event such as a car accident. The consequences of the accident can be found on a scale of minor to serious. A 'fender bender' is minor, but a car hitting a tree at speed is serious. Now, we look at the reasons for the negative outcome. Perhaps driver experience is the threat... or perhaps a rainy day with slippery roads is the threat. By mapping the threats (driver experience, rainy day, etc) and the consequences (minor scrape, major crash) and putting them into context is the process of defining the risk criteria.

4.1.5 Setting risk criteria. When defining and establishing the risk criteria the following considerations must be taken into account

- what are the likely consequences?
- how are they to be measured?
- how is likelihood to be measured?
- how will they be combined to determine a level of risk?
- what level of risk is tolerable and at what level?[2]

4.2.3 Risk criteria scales. NSW risk management policy advises that it is not necessary to 'reinvent the wheel'.[3] To create suitable scales, the risk criteria scales of similar operators were referred to and contextualised to make them suitable for the department's aviation operations. These operators were:

- NSW Rural Fire Service[4]
- NSW Department of Primary Industries[5]
- HeliSurveys (current aviation contractor)[6]
- NSW Treasury Risk Management Toolkit[7]
- DPIE's CAMMS risk analysis matrix, likelihood and consequence tables[8]
- ISO/IEC 31010 - International Standard - Risk Management - Risk assessment techniques.[9]

4.2.4 Matrix and tabular format for risk analysis. ISO has published a guide for risk assessment techniques as an international standard. In *Techniques for recording and reporting*, it outlines a standard for the creation of risk analysis tools using the popular consequence/likelihood matrix method and table format.[10] It also recommends the use of

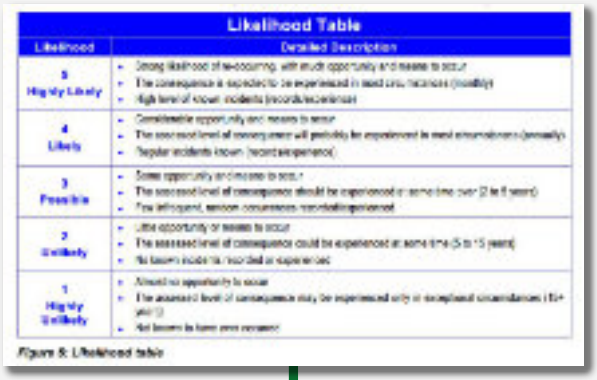
Crown Lands Risk Management

Establishing a likelihood table

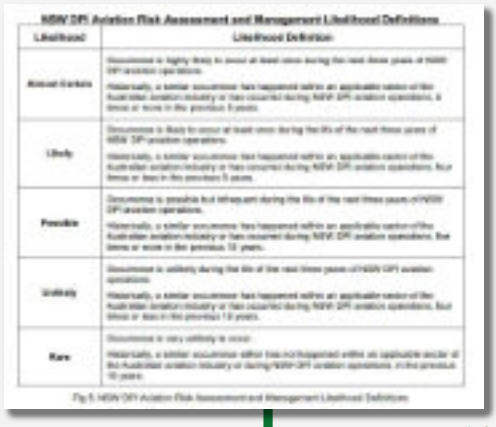
In keeping with the core requirements of NSW Treasury advice on risk management, a likelihood table has been derived from three key sources: the current CAMMS Workplace Health and Safety likelihood scale as used in its departmental WHS hazard and incident reporting system; the NSW RFS Organisational Risk Management model; and the Department of Primary Industry's risk management format previously used by DPE.

In consultation with DPE Crown Lands key personnel, and referencing the ATSB and BITRE databases, an appropriate likelihood table has been created in accordance with ISO standards and guidelines.

DPE CAMMS WHS reporting Likelihood table



NSW RFS Organisational Risk Management Likelihood table



DPI Risk Management Likelihood table

Australian Government
Department of Infrastructure, Transport Regional Development and Communications

Statistical analysis from the Bureau of Infra-structure, Transport Research Economics (DITRDC)

ATSB

Statistical analysis from the Australian Transport Safety Bureau

1 **Likelihood Table of an event occurring during the DPE Aerial Inspection Program**

5 Almost Certain	• Greater than 90% chance of occurring • "Happens often" or "Usually happens" • Could occur "this time or the next"
4 Likely	• Greater than 50% chance of occurring • "Could easily happen this time " • Could occur within "days to weeks"
3 Possible	• Greater than 10% chance of occurring • "Could conceivably happen" or "Has occurred before" • Could occur within "the next 12 months"
2 Unlikely	• Greater than 1% chance of occurring • "Hasn't happened yet, but possibly could" • Could occur sometime within "the next few years"
1 Rare	• Less than 1% chance of occurring • "Conceivable, but only in extreme circumstances", or "Exceptionally unlikely, even in the longer term". • A"once in a hundred years" event

risk registers to monitor and report on threats and their associated risks.[11]

4.2.5 Constituent matrices to aid in risk assessment. Because risk is the product of the identification of a threat, the likelihood of encountering the threat (which includes exposure), and the consequences of the threat being realised as a negative event, a risk matrix will need inputs on likelihood and consequence. The resultant outputs are these:

- **Likelihood table** - an analysis of the likelihood of an event occurring given as a word picture, percentage probability or some other descriptive measure. It must be contextual based on the nature of the threats and their likelihood of eventuating and the exposure to the threat. The infographic above shows how the DPE likelihood table has been derived.
- **Consequence matrix** - the conjoined tables of consequences measured in different dimensions, such as financial, reputational, health and safety, capability and any other relevant dimension. The consequences, like the likelihood, must be contextual for the organisation and as objective as possible. The infographic below shows how the DPE consequence matrix has been developed.
- **Likelihood/Consequence (Risk rating) table** - the analysis of the risk associated with a threat/hazard by comparing the likelihood of the threat being realised and the consequences if it results in a a negative outcome (or positive outcome if looking at positive risk).

Crown Lands Risk Management

Establishing a consequence matrix

A consequence matrix looks at what happens if an event occurs and the resultant outcome, either positive or negative. It will scale the rating from least serious to most serious and do so across one or more dimensions.

In consultation with DPE Crown Lands key personnel, and referencing the DPE CAMMS WHS reporting consequence table, the DPI aviation tasks risk assessments and NSW RFS Organisational Risk Management consequence matrix, a bespoke DPE consequence matrix has been derived.

DPE CAMMS WHS reporting Consequence table

NSW RFS Organisational Risk Management Consequence matrix

DPI Risk Management Consequence table (extract)

Expert input from DPE Crown Lands key manager and program owner

Expert input from program coordinator and senior Mission Commander

2 **Negative Consequence Table for an incident involving DPE Aerial Survey Program**

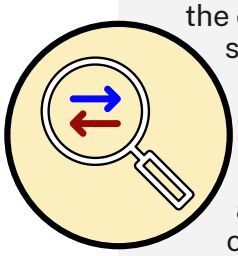
	Health and Safety Impact	Capability Impact (pers or eqpt)	Financial and Reputational Impact	Legal/Regulatory Impact
5 Extreme	Multiple fatalities and/or critical injuries with significant hospital attention required.	Loss of key service delivery requiring replacement or external assistance for extended period.	Financial loss of up to $10 million (or possibly more). Significant reputational damage to Govt.	Public scrutiny. Prosecutions, fines or class action. Legal action against responsible officers.
4 Major	Single fatality and/or serious injuries with significant hospital attention required.	Loss of key service delivery requiring replacement or external assistance for short period (eg 1 week).	Financial loss of up to $1 million. DPE reputation damaged.	Public scrutiny. Prosecutions by regulator or fines. Investigation into role of responsible officers.
3 Moderate	Work limiting injuries with medical attention required.	Delay to service delivery for short period (eg 1 day).	Financial loss of up to $100,000. DPE reputation suffers.	Investigation by regulator. Possible punitive action. Recommendations. Audit.
2 Minor	Minor injuries with some minor attention required.	Disruption to service delivery.	Financial loss of up to $10,000. DPE reputation on internal audience tarnished.	Investigation by the department using internal processes.
1 Insignificant	Near miss.	Delay to service delivery to reassess the operation being undertaken.	Financial loss of up to $1,000. Little to no effect on DPE reputation.	Checks made by operators to ensure current risk management is adequate.

Section 4.3: Risk identification

4.3.1 Identifying and analysing hazards. Now that risk criteria have been established as likelihood and consequence and an associated rating, the task of identifying threats and analysing them occurs. A systematic analysis of threats that are applicable by phase can be made and compared against rules and procedures. Once threats have been identified and analysed, the assessment against historical data can then be made.

Application of DPE threat classes per phase

4.3.2 Identifying and analysing threats by phase. By dividing a DPE aerial inspection campaign/mission into its constituent phases as described in section 4.1, and then identifying relevant obligations against the various references, likely threats related to the obligation, violation or mistake can be identified and mitigated against. This analysis aids in creating an appropriate mission checklist as part of the risk management process. Here are the obligations and mitigations against possible threats:



4.3.3 Phase 0. Campaign planning (incl training and inter-agency/external stakeholder relationships and administration/management of campaign)

a. Confirm that a suitable contractor is sourced and contracted to provide aircraft, support equipment and qualified personnel for the conduct of the aerial inspection campaign in accordance with current Commonwealth, state or statutory requirements for the supply of aerial support such as NAFC, State Air Desk, Operational Business and Procurement team, etc and has been approved by the department for use in the aerial inspection campaign.

b. For the purpose of the campaign, confirm that the supplied contractor's personnel are qualified[1] — with the correct licences and endorsements — and experienced for the task, and within their qualifications currency period as stipulated by aviation regulations and the contractor's CASA-approved operations manual.[2]

c. Ensure all personnel involved in aerial inspection and other aviation activities for the department have access to and are familiar with the *NSW and ACT Aviation Standard Operating Procedures*.[3]

d. Ensure all personnel involved with the aerial inspection program are suitably trained and qualified to carry out their roles and have been trained to a level suitable to the department as determined by the State Bush Fire Coordinator (as program manager) or his/her delegate and have the required experience and recency to carry out the task as determined by the State Bush Fire Coordinator (as program manager) or his/her delegate.

e. Confirm that there are a sufficient number of personnel available that have the physical and psychological aptitude for the role of air observer and can be trained and who are then available for the aerial inspection campaign.

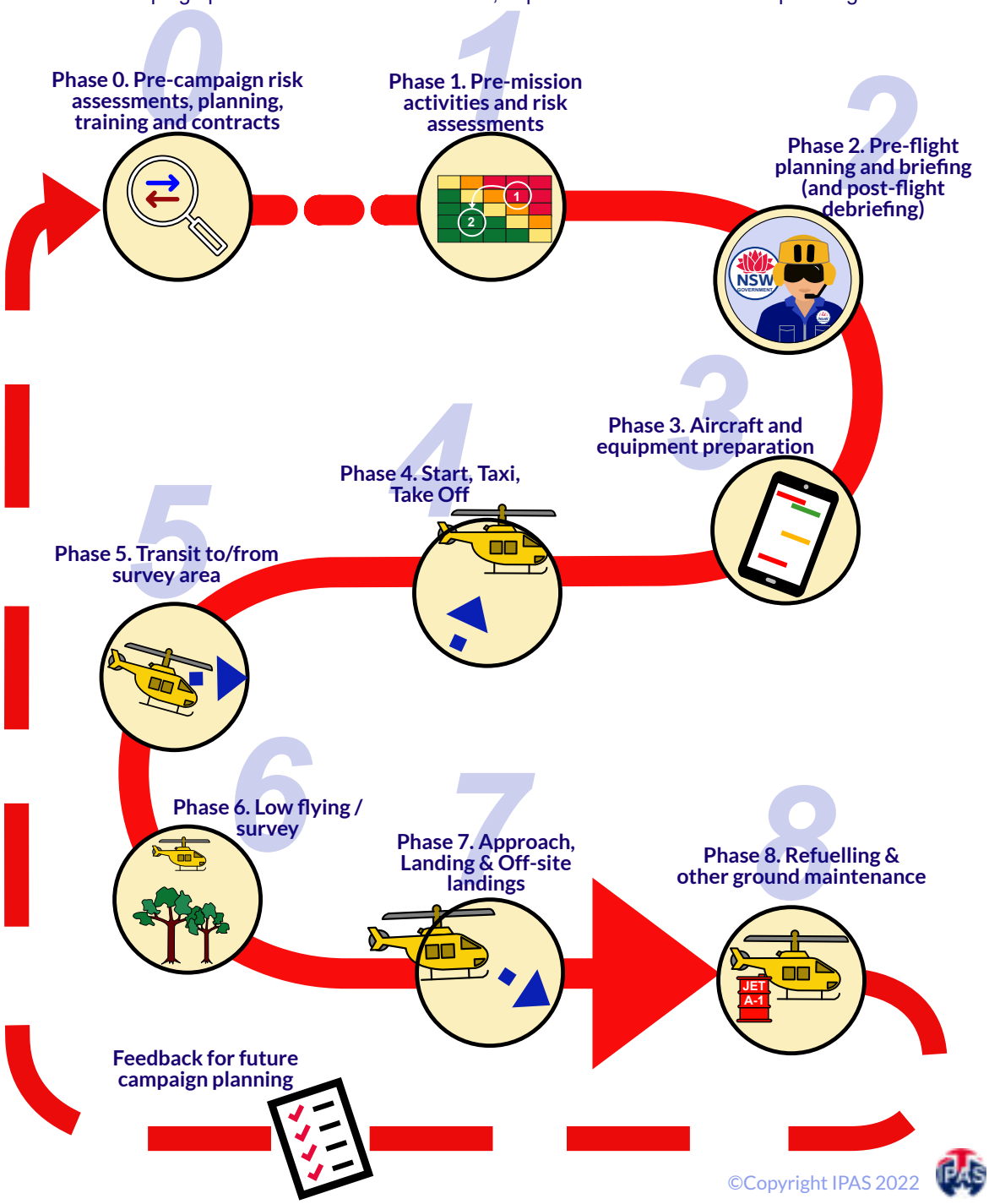
f. Confirm that notifications of aerial inspections have been issued where necessary and responses gathered and these responses have been integrated into the mission planning.[4]

g. If an aerial work operation is to occur in a location that requires an aerial work zone to be promulgated (usually populous areas or other areas where low-flying aircraft can cause significant disruption), then such an AWZ is requested and coordinated.

Aerial survey phases

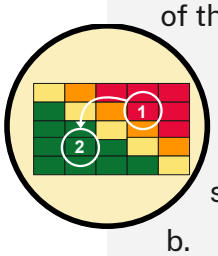
Discrete activities associated with survey

The DPE Aerial Survey flight can be broken down into discrete phases for the purpose of planning and assessing risk. After each flight or after the campaign in general, feedback is provided to campaign planners for continuous review, improvement and next-round planning.



h. Guard against ongoing aerial inspection programs generating interest from other stakeholders leading to requests for DPE Crown Lands to undertake further tasks during the aerial inspection campaign for which Crown Lands is not resourced and which may lead to undue pressures and expectations (mission creep).

i. Ensure other stakeholders are appraised of upcoming operations and appropriate measures are taken to ensure that, where necessary, they are involved in, or informed of the planning and will be recipients of that and subsequent information.



4.3.4 Phase 1. Pre-mission activities and risk assessments

a. Confirm all crew members fit for duty[5] including requirements for the consumption of alcohol and fatigue as described in the regulations.[6]

b. DPE Crown Lands personnel on aerial inspection campaigns will comply with the following fatigue management requirements and shall seek authorisation to exceed them from the campaign coordinator:[7]

- a standard duty day will be not normally longer than 10 hours but can be extended to 12 hours by exception (eg to reposition to a home location)
- travel time to or from home location to position/reposition for/from duty shall be included as duty and shall not exceed 12 hours
- no travel to reposition from duty (ie to travel to a home location after a day's flying duty, for example) shall commence after 5pm local time unless authorised by the campaign coordinator (DPE personnel will be accommodated overnight so as to commence travel the following day)[8]
- a flying hours limitation of 8 hours shall apply within a duty day.[9]

c. If flight crew are working under CAO 48 Appendix 5A (aerial work by day fatigue management), the following limitations shall apply:

- all personnel have had an opportunity for at least 8 hours sleep prior to commencing duty but within the last 10 hours prior to the start of duty.
- all personnel have had at least 48 hours off duty in the last 16 days.[10]
- all personnel have had at least 2 days (cumulative) in the last 28 days.[11]

d. Ensure that no person performing a safety sensitive aviation activity shall be under the influence of alcohol or intoxicants that will affect his or her ability to perform their duty. (A CASA drug test may be carried out at random. A blood alcohol content of less than 0.02 grams of alcohol in 210 litres of breath is the permitted level for alcohol.[12] For other prescribed intoxicants, refer to CASR 99.010)

4.3.5 Phase 2. Mission Planning and Briefing (incl Post Mission Debrief)

a. Check that all necessary aerodromes/air routes are available for use[13]

b. Check that all relevant NOTAMS including Head Office, flight route and location-specific, have been checked[14]

c. Prior to flight, the PIC must have studied the authorised weather forecasts and reports for the route being flown and for the departure aerodrome and destination aerodrome and any planned alternate aerodromes or any other reasonably available weather information that is relevant for the intended operation[15] within at least one hour before the flight.[16] (If a weather forecast/report is not available, the PIC shall assess the weather conditions and may depart provided he or she can ensure that he or she can safely return to the departure aerodrome within one hour after departure[17] if he or she cannot obtain a

forecast for the destination aerodrome.)

d. The PIC is responsible for, and will conduct flight planning and performance planning and provide the mission commander and mission crew a brief on the expected performance of the aircraft and associated support equipment based on the environmental conditions, aircraft configuration, passengers and payload and any adjustments or mitigations are implemented.

e. Confirm that the PIC is responsible for submitting flight notifications in accordance with the requirements of the Part 91 Manual of Standards (Chapt 9) and any other notification requirements of his or her company or the department.[18]

f. Check that all crew and passengers have been given a safety briefing covering the required items in the MOS.[19]

g. Ensure a mission briefing has been completed and aircrew and mission crew have assessed the requirements of the mission and conducted a risk assessment based on available information.[20]

h. Confirm that the members of the aircrew and mission crew acknowledge the responsibilities of the PIC and the mission commander as per CASRs, *NSW and ACT Aviation SOPs*,[21] and the applicable contractual arrangement whereby the PIC has final authority over the aircraft and the discipline of all occupants and must ensure the safety of occupants, the safety of cargo and the safe operation of the aircraft during flight.[22]

i. Confirm that the members of the mission crew are appropriately trained[23] and approved for duty by the department as assessed by the PIC as being competent to perform their duties.

j. Confirm that planned mission has been assessed for relevant risks and all risk assessment materials have been briefed[24] and signed/acknowledged and the mission has been briefed to the risk owner one level up via a suitable means[25] and recorded in the required aviation management system.[26]

k. Ensure that all persons on board are necessary for flight; authorised to fly and have been manifested in accordance with NSW Government aviation SOPs[27] and departmental requirements.

4.3.6 Phase 3. Aircraft and mission specific equipment preparation and loading

a. GNSS integrity checked (if reqd).[28]

b. All equipment required by legislation to be fitted/carried by the aircraft is available and functioning correctly[29] including all safety and emergency equipment as listed in the MOS.[30]

c. Check all aircraft hatches, access ports, panels, fuel tank caps are secured.[31]

d. Check all control locks, covers and ground safety devices/restraints have been removed.[32]

e. Check that a maintenance release/certificate of release to service (as applic) is confirmed and current.[33]

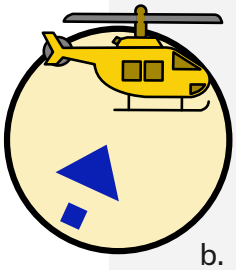
f. Ensure all equipment required to be carried by aircrew and mission crew is stored or secured correctly,[34] within weight and balance requirements[35] and is available for use if required.

g. Ensure all items carried on board have been consented to by the PIC.[36]

h. Make sure that there is no fire hazard or electrical device being operated[37] within 15m of refuelling equipment or of the aircraft when being refuelled[38] unless the item is exempt from this requirement in accordance with the CASRs.

i. Ensure fuel and oil quantities have been checked[39] and fuel integrity confirmed.[40]

j. Confirm that the aircraft is configured appropriately for aerial inspection with doors fitted or removed (normally fitted) as required for the task.[41]

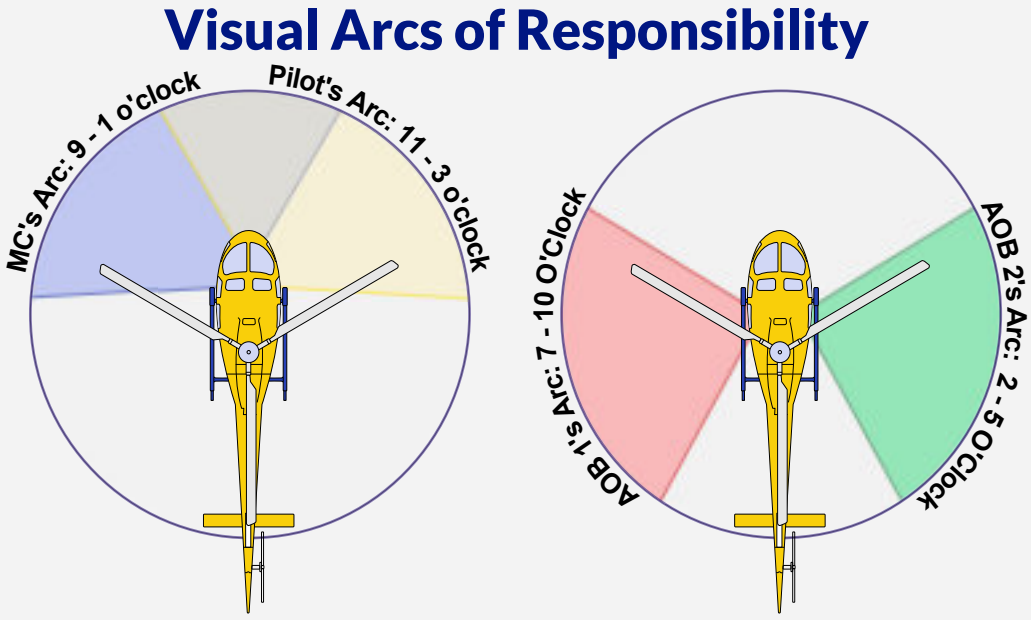


4.3.7 Phase 4. Start / Taxi / Take off

a. Ensure that the required fuel for the flight is on board and is available as per the approved company operations manual and the MOS.[42]

b. Test the aircraft controls to ensure they are working and functioning correctly.[43]

c. Ensure that the pressure altimeter measures the site elevation within limits when using an authorised QNH.[44]



Visual Arcs of responsibility. Every member of the crew is responsible for his or her safety and for the safety of others. Assisting the pilot by looking out for hazards and informing the crew is part of that responsibility and is also good airmanship. The diagram above shows the basic 'clock ray' directions of visual arcs of responsibility based on a crew member's seating position. *(Image by Conway Bown)*

d. Confirm that the minimum meteorological requirements for take off exist and are complied with.[45]

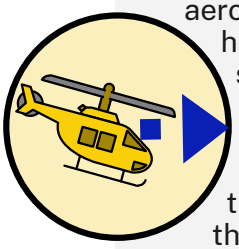
e. Ensure all persons are seated in an approved seat with an approved harness and the person is using that harness as directed by the PIC.[46]

f. The PIC is to ensure that the aircraft has the performance to avoid obstacles during the take off phase and in the vicinity of the flight path.[47]

g. The PIC must ensure that the take off is, as far as is practicable, into wind or that the aircraft flight manual permits take offs not into wind[48] and that the the take off is carried out safely and does not endanger other persons or aircraft.[49]

h. Departing an aerodrome or HLS is a critical phase of flight requiring enhanced awareness of aircraft performance and the local environment for hazards. Hazards may be other traffic, especially when operating from a physical aerodrome, or hazards such as obstacles, birds, ground obstacles, powerlines, loose materials (or other items that may be impacted by rotorwash), animals and bystanders, especially when operating from an HLS. This is even more true when operating to/from an unusual or unprepared area or in remote environments. Ensure sterile cockpit procedures are followed during all critical phases of flight and any talking must be restricted to operationally necessary topics and only when necessary.

i. Ensure all crew members conduct their lookout through their arcs of responsibility during the climb and the en-route transit phases of flight to/from the inspection area and particularly when near areas of higher traffic intensity such as aerodromes, airports and lanes of entry or known areas of aerial hazards such as hang gliding, parachuting, remotely piloted aircraft operating areas, birds and similar.



4.3.8 Phase 5. Transit (to or from the Aerial Inspection area)

a. Flight through a designated Prohibited Area is not permitted. [50] Flight through a Restricted Area is not permitted without proper authorisation through the relevant airspace manager as per the Designated Airspace Handbook. [51] Flight through a designated Danger Area may occur, provided that the pilot can:

(i) Identify the reason for the area being designated a Danger Area.

(ii) During the flight, the PIC takes appropriate precautions against risks to safety that could arise from the flight. [52]

b. Ensure that flight during the transit phase will be conducted within agreed Visual Meteorological Conditions for the class of airspace and type of aircraft, specifically:

- For all aircraft in Classes A, B, C, E or G airspace below 10,000’ AMSL - 5000 metres flight visibility; 1500 metres horizontally and 1000’ vertically clear of cloud.
- For all aircraft in Class G airspace below 3000’ AMSL or below 1000’ above ground level (whichever is higher) - 5000 metres flight visibility and clear of cloud.
- For a helicopter in Class G airspace below 700’ above ground level - 800 metres flight visibility and clear of cloud and in accordance with the radio and aerodrome requirements as listed in the Part 91 MOS, s. 2.07.[53]

c. Ensure that the minimum altitude during the transit phase shall be in accordance with the requirements of CASR 91.265 which, (in sum) are:

(i) Not below 500’ above the highest obstacle within 300m of a helicopter or 600m of an aeroplane when flying over non-populous areas, or

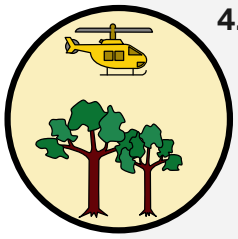
(ii) Not below 1000’ above the highest obstacle within 300m of a helicopter

or 600m of an aeroplane when flying over populous areas or public gatherings.[54]

d. Ensure that the aircraft is flown clear of any airborne or other hazards such as wildlife, birdlife, obstacles, other aircraft, remotely piloted aircraft or any other object that would constitute a hazard to flight, and that all members of the crew are to assist with searching for hazards and shall notify the PIC of any hazards seen in order to maintain safety.[55]

e. Ensure that the aircraft is flown by the most direct route to the commencement of the aerial inspection with the start point directed by the mission commander.

During the low-flying aerial inspection phase, the aircraft must be flown at an altitude commensurate with the environmental visibility and that of the target. Likely areas for turbulence must be identified and all crew members must be vigilant for hazards, especially in their arcs of visual responsibility.
(Image by Conway Bown)



4.3.9 Phase 6. Low Flying / Aerial Inspection Phase

a. Confirm that upon arrival at the inspection area, low flying checks are carried out, including:

(i) Preparation of the cabin, crew members' belongings and personal equipment, and all cabin contents.[56]

(ii) PPE is made ready[57] and other equipment readied for the aerial inspection and secured to prevent loss overboard.[58]

(iii) SAR and other notifications have been made (normally by the PIC) and coordinated between crew members.[59]

(iv) An aerial reconnaissance of the area prior to descent is conducted searching for obstacles and other hazards.[60]

(v) Sterile cockpit procedures are to be used (operationally essential communications only).[61]

(vi) Ensuring that all crew members conduct lookout through their arcs of responsibility during the descent, the low-level flying phase, the climb and the en-route transit phases of flight to/from the aerial inspection area and particularly when approaching areas of higher traffic intensity such as aerodromes, airports and lanes of entry or known areas of aerial hazards such as hang gliding, parachuting, remotely piloted aircraft operating areas, birds and similar.

(vii) Likely turbulence areas are predicted based on prevailing conditions, and briefed to the crew and that the aircraft is flown accordingly.[62]

(viii) Descent to inspection altitude is carried out at a rate commensurate with the aircraft's performance and environmental conditions while maintaining separation from obstacles.

(ix) All of sub-sub paragraphs (i) through (viii) above are carried out as part of the pre-aerial inspection and pre-low level flight aerial risk assessment in accordance with the requirements of the MOS [63] and in conjunction with the pre-mission risk assessment.

b. Confirm that the pilot flying commences the aerial inspection operation under the direction of the mission commander at an altitude commensurate with the environmental visibility, and the visibility of the target as seen through obstructions

c. Ensure that the aircraft is flown in such a way so as to spend the minimum amount of time in the avoid area of the aircraft's height/velocity diagram as laid out in the aircraft flight manual.

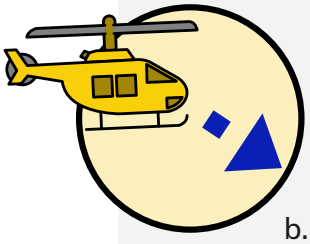
d. Confirm that the aircraft is flown in accordance with the CASA-approved operations manual of the contracted organisation, and as per the recommended manner as stipulated by the aircraft manufacturer while maintaining the appropriate adherence to the CASRs and other relevant legislation.

e. If a prior public notice relating to the aerial inspection has NOT been issued, and the aircraft is to be flown lower than 300 feet above the highest obstacle, then ensure that the aircraft is maintained at least 150 metres away from any person, vehicle, structure or livestock likely to be affected by the aircraft's noise.[64] (An AWZ may be required if these conditions cannot be met. Refer to the MOS for further details).

f. Ensure that the aircraft is flown in such a way, and at such an altitude that, in the event of an emergency, the pilot is able to avoid endangering any person, vehicle, structure or livestock.[65] (An AWZ may be required if these conditions cannot be met. Refer to the MOS for further details).

g. The PIC is to ensure that the aircraft is flown in such a way so as to maximise the time the aircraft is operated over suitable forced landing areas, and in such a manner that there is a reasonable expectation that there would be no injuries to persons in the aircraft or on the ground in the event of a forced landing. [66]

h. A suitable forced landing area is one where if a helicopter was required to make a forced landing, then there would be a reasonable expectation that there would be no injuries to persons in the aircraft or on the ground. [67]



4.3.10 Phase 7. Approach / Landing

a. The PIC is to ensure that the aircraft has the performance to avoid obstacles during the approach and landing phase and at all times in the vicinity of the flight path. [68]

b. Confirm that a helicopter may be landed at any location that is suitable for it to land and take off and do so safely with regard to all the circumstances that

may affect the landing and take off, including weather. [69] Such a place may be referred to as an aerodrome even if there are no physical buildings or other infrastructure at the location,[70] (however a more common term is Helicopter Landing Site, or HLS). [71]

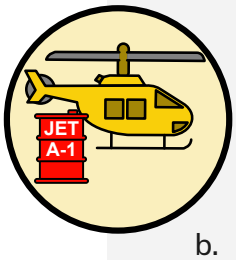
c. A pilot operating an aircraft must do so in a manner that does not create a hazard to another aircraft, person or property.[72]

d. A 'basic HLS' can be considered to be an unprepared or confined area that does not provide safety margins of locations designed for the use of helicopters on a regular basis and in accordance with ICAO standards. It is recommended that a basic HLS be large enough to incorporate a safety margin and be clear of obstacles to allow for approach, landing and departure under all expected operational conditions. [73]

e. When approaching or departing an HLS, or when operating from an HLS, it is recommended that passengers, crew and operational personnel be briefed on the hazards of the site and any site-specific safety procedures needed to ensure the safe loading and unloading.[74]

f. Landing at a HLS may contravene local or state ordnances/laws. It is the PIC's responsibility, in conjunction with the mission commander where appropriate, to seek permission to land at a location that is not a public aerodrome or other approved HLS. This does not necessarily apply if the landing is an emergency landing and doing so is to ensure safety.[75]

g. Approaching an aerodrome or HLS is a critical phase of flight requiring enhanced awareness of aircraft performance and the local environment for hazards. Hazards may be other traffic, especially when operating from a physical aerodrome, or hazards such as obstacles, birds, ground obstacles, powerlines, loose materials (or other items that may be impacted by rotorwash), animals and bystanders, especially when operating from an HLS. This is even more true when operating to/from an unusual or unprepared area or in remote environments. Sterile cockpit procedures must be followed during all critical phases of flight and any talking must be restricted to operationally necessary topics and only when necessary.



4.3.11 Phase 8. Refuelling and other ground activities

a. Ensure that during fuelling operations, a fire hazard must not exist or be created within 15 metres of the aircraft or the aircraft refuelling equipment.[76]

b. Confirm that approved and appropriate fire extinguishers are available during refuelling and positioned no closer than 6 metres and no further than 15 metres from the refuelling point.[77]

c. No electronic devices are allowed to be used within 15 metres of a critical refuelling point for the aircraft being refuelled [78] unless it is a device or instrument that is used as part of the normal refuelling process or has been proven to be non-hazardous to the operation[79] and is compliant with industry standards as listed in CASR 91.485. All crew are to be aware and ensure they comply.

d. Hot refuelling of aircraft is only to be conducted on approval by the department and in accordance with the CASRs and the contractor's approved operations manual. This activity will not normally be critical to DPE aerial inspection operations and will require consultation before being considered for approval by the DPE.

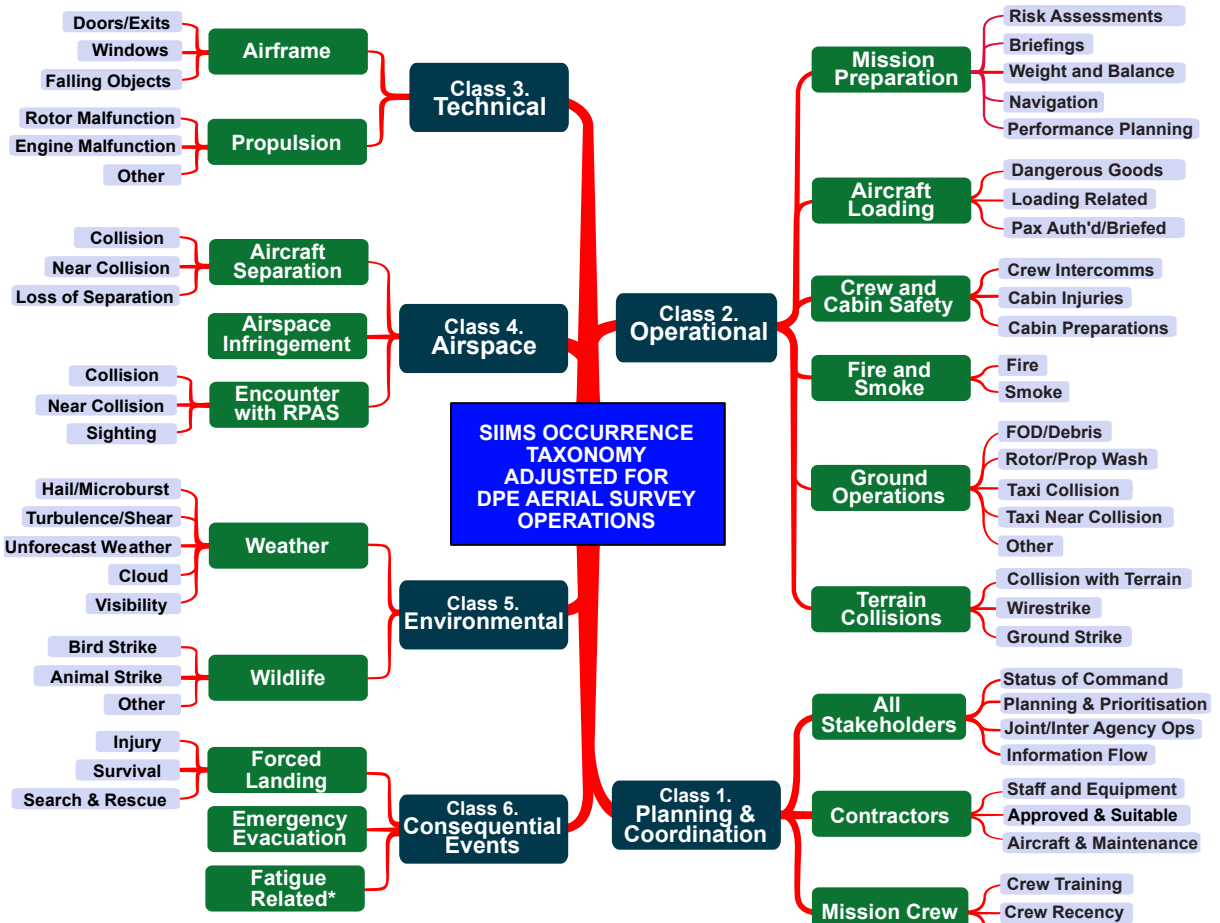
e. All personnel not required to be aboard an aircraft during fuelling operations are to disembark and are to remain clear of the fuelling operation unless operationally necessary. The recommended distance to remain clear is 15 metres or further.

f. All personnel are to ensure that they are able to complete their post-mission

The SIIMS Taxonomy for DPE

A classification system for Crown Lands

The ATSB SIIMS Taxonomy can be adjusted for DPE aerial survey operations to cover aviation-related incidents as a part of the risk management process. The threats that may be encountered are classified into six classes and each is then further divided into sub-classes. These sub-classes are looked at in more detail to derive those threat areas that need to be addressed. For example, loading dangerous goods would be in the 'Aircraft Loading' sub-class of the 'Operational' class of threats.



*Fatigue is included as a special threat derived from flight duties combined with post-duty travel requirements.

Derived from ATSB image

Section 4.4: Risk analysis

4.4.1 Why is flying considered dangerous? This is a good question. It's probably because it is a novel experience. Human beings are normally earthbound, and so flying through the air is unusual. Furthermore, when an accident does occur, it generates more interest than the more commonplace car accident and so tends to remain in a person's consciousness more so than a car crash. In fact, flying is both statistically and actually more safer than driving, yet we are concerned about flying but don't think twice about allowing someone to drive.

4.4.2 Aviation is safer because of its regulations and reliability. Within the aviation industry, aircraft operators, aircrew, maintenance personnel and other support personnel are all highly trained and highly regulated, particularly in western countries. The engineering reliability is extremely high and constant checking of humans as well as machines ensures continued high performance and a reduction in threats to safety. The same cannot be said for road users.

4.4.3 Risk comparison with road statistics. The claim that aviation is inherently safer than driving is easily borne out of the statistics as follows:

- In the ten years to 2022, there were 11791 road fatalities in Australia averaging 1150 deaths per annum towards the latter years of that period. For the same period, there were 12 fatalities in airwork operations averaging 1.2 fatalaties per annum.
- Over the period in question, there were 45 serious injuries and 63 minor injuries in helicopter crashes during aerial work operations. For the same period there was an average of 39,455 hospitalisations due to road accidents per annum with an average of over 9,000 hospitalisations with life threatening injuries per annum.[1]

4.4.4 Contributing factors to road deaths. Interestingly, some of the contributing factors to the high number of road deaths and injuries are factors that are specifically targeted as risks in aviation and, as such, have stringent controls in place to mitigate the same risk. What this means is that the causal factors for road trauma and death, namely:

- seatbelts
- drugs
- alcohol
- helmets (motorcyclists/cyclists) [2]

do not have the same impact in aviation, particularly rotary-wing operations, because of the higher level of regulation and safety standards and procedures. Seatbelts and helmets are worn in almost every situation, and are a requirement of the DPE, and drugs and alcohol can be checked at anytime. Furthermore, the type of person attracted to a career in aviation is usually more highly motivated, educated and more safety aware. The same cannot be said of every motorist or cyclist.

4.4.5 Aviation safety in general. When we look more closely at aviation statistics, we see that in the ten-year period from 2010 to 2019, there were no fatalities in commercial air transport operations [3] (eg airlines and other regular public transport services).

4.4.6 Aviation safety in the general rotary wing aerial work category. In the five-year period from 2015 - 2019, the rate of accidents for helicopters in aerial work was 58.8 per one million hours flown, or 0.0000588%.[4]

In the same period, the number of accidents for helicopters in aerial work that resulted in one or more fatalities was 4.5 per one million hours flown, or 0.0000045%.[5]

4.4.7 Aviation safety in the specific rotary wing aerial work photo/survey category. More specifically, the accident and fatality accident rate for helicopters involved in survey/photographic work, the closest flight mission to fire trail aerial inspection, was 22.9 for every one million departures, or 0.0000229% for accidents in general, and 7.6 for every one million departures, or 0.0000076%.[6] Bear in mind that a departure is a take off on a sortie and the sortie could be more than two hours long, and that must be taken into account when comparing it to the statistic immediately before it.

Specific analysis of aerial inspection-like operations

4.4.8 Aviation safety in the specific rotary wing aerial work photo/survey category. Using the ATSB database and applying filters for each of the identified classes and categories of threats, accidents, incidents, fatalities and injuries can be extrapolated. For the ten year period from May 2012 to May 2022, the following statistics were derived.

Class 1. Planning and Coordination

4.4.9 Crew Fitness for Duty / Fatigue

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality. Fatigue risks are discussed as a Class 6 Consequential action.

Class 2. Operational Terrain Collisions

While wirestrike is a hazard to low-level flying, there were no incidents of wirestrike for photography/ survey aerial work which closely approximates an aerial inspection program.

4.4.10 Ground Strike

Seven occurrences of ground strike were recorded resulting in three accidents but no harm to a person was reported. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

4.4.11 Wirestrike

42 occurrences of wirestrike were recorded resulting in 22 accidents with three fatalities and ten injuries. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

4.4.12 Collision with terrain

108 occurrences of collision with terrain were recorded resulting in 98 accidents and seven fatalities and 46 injuries. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

Ground Operations

4.4.13 Taxi near collision

25 occurrences of taxi collision and taxi near collision were recorded resulting in six accidents and two serious injuries. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

4.4.14 Taxi collision (See above)

4.4.15 Rotor/prop wash

12 occurrences of rotor/prop wash occurrences were recorded resulting in one serious injury. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

4.4.16 FOD/Debris

Nine occurrences of rotor/prop wash occurrences were recorded resulting in one serious injury. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

Fire and Smoke

4.4.17 Smoke

13 occurrences of smoke were recorded resulting in two minor injuries. There was one occurrence in the helicopter aerial work category for aerial inspection/photography.

4.4.18 Fire

Six occurrences of fire were recorded resulting in, or due to, two accidents but with no injuries. There was no occurrence in the helicopter aerial work category for aerial inspection/photography.

Crew and Cabin Safety

4.4.19 Cabin Preparations

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality.

4.4.20 Cabin Injuries

Seven occurrences of cabin injuries were recorded resulting in one fatality and six injuries. There was one occurrence in the helicopter aerial work category for aerial inspection/photography resulting in a minor injury.

4.4.21 Crew Intercomms

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality.

Aircraft Loading

4.4.22 Loading related

Four safety occurrences that were loading related were recorded resulting in one accident. No harm was suffered due to this reason. There was no occurrence in the helicopter aerial work category for aerial inspection/photography.

32 safety incidents related to falling objects were recorded. No injuries were suffered but one major incident occurred during aerial inspection/photography operations.

4.4.23 Dangerous Goods

One safety occurrence related to dangerous goods was recorded resulting in one incident. No harm was suffered due to this reason. There was no occurrence in the helicopter aerial work category for aerial inspection/photography.

Mission Preparation

4.4.24 Performance Planning

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality.

4.4.25 Navigation

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality.

4.4.26 Weight and Balance

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality.

Class 3. Technical

Airframe

4.4.27 Doors/Exits

Eight safety occurrence related to doors and exits were recorded as minor incidents. No harm was suffered due to this reason. There was no occurrence in the helicopter aerial work category for aerial inspection/photography.

4.4.28 Windows

12 safety occurrences related to windows were recorded as incidents. No harm was suffered due to this reason. There was one occurrence in the helicopter aerial work category for aerial inspection/photography.

4.4.29 Falling Objects

32 safety incidents related to falling objects were recorded with one being classified as an accident, 29 as minor incidents and two as a major incidents. No injuries were suffered but one major incident occurred during aerial inspection/photography operations.

Propulsion

4.4.30 Rotor malfunction

12 safety occurrences related to rotor malfunctions were recorded with three being classified as an accident, eight as minor incidents and one as a major incident. There were three minor injuries from this classification of occurrence. There were no occurrences in the helicopter aerial work category for aerial inspection/photography listed as a major incident.

4.4.31 Engine malfunction

47 safety occurrences related to engine malfunctions were recorded with 15 being classified as accidents, 22 as minor incidents and 10 as a serious incidents. There were no occurrences in the helicopter aerial work category for aerial inspection/photography listed as a major incident.

4.4.32 Other (transmission, gearbox, systems, APU, etc)

54 safety occurrences related to propulsion malfunctions - other - were recorded with 12 being classified as accidents, 35 as minor incidents and seven as serious incidents. No harm eventuated from this classification of occurrence. There were three occurrences in the helicopter aerial work category for aerial inspection/photography with one listed as an accident and two listed as minor incidents.

Class 4. Airspace Aircraft Separation

4.4.33 Collision

No ATSB statistics were categorised in this class and category that resulted in an occurrence or an injury/fatality.

4.4.34 Near Collision

17 safety occurrences related to engine malfunctions were recorded all being classified as serious incidents. No injuries occurred. There were four occurrences in the helicopter aerial work category for aerial inspection/photography.

4.4.35 Loss of Separation

35 safety occurrences related to loss of separation were recorded all being classified as serious incidents. No injuries occurred. There were no occurrences in the helicopter aerial work category for aerial inspection/photography.

4.4.36 Airspace Infringement

11 safety occurrence-related to airspace infringement were recorded all being classified as minor incidents. No injuries occurred. Four of these occurrences were in the helicopter aerial work category for aerial inspection/photography listed as minor incidents.

Encounter with RPAS

There were no reported collisions with RPAS during the reporting period.

4.4.37 Near Collision

There were 34 near collisions with RPAs all listed as incidents.

4.4.38 Sighting

No reported sightings of RPAs were listed which could be because they were not considered a risk to the people involved.

Class 5. Environment

Weather

4.4.39 Hail/Microburst and Turbulence/Shear

The hail, microburst, turbulence and wind shear occurrences were combined in the ATSB reporting. There were two occurrences of which one was an accident and one was a serious incident. One of these accidents was during photo/aerial inspection work, but no injuries were reported.

4.4.40 Unforecast Weather

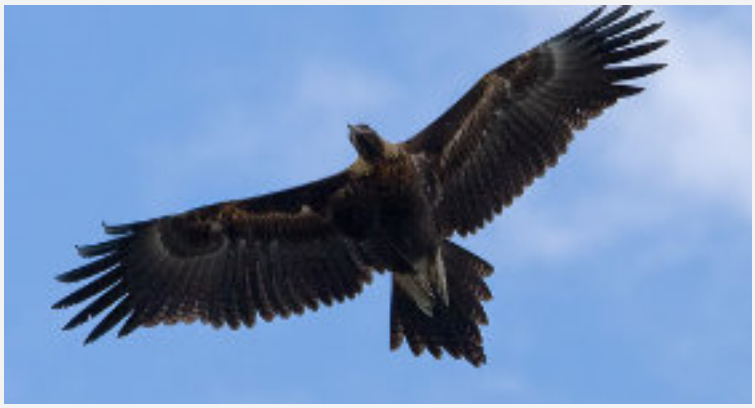
Two incidents of 'unforecast weather' were recorded resulting in no injuries. None were reported during photo/aerial inspection work.

4.4.41 Cloud and Visibility

Cloud and visibility were not listed as categories of occurrences in the ATSB reports but are listed here because they are relevant to DPE operations as a threat.

Wildlife

4.4.42 Bird Strike



Bird strike was a not uncommon occurrence with 131 reported events of which three were listed as accidents and the rest as incidents. Of these, eight were during photo/aerial inspection operations.

4.4.43 Animal Strike

Animal strikes normally occur on runways and so reported instances of animal strike for helicopters is rare. There was one instance of animal strike but none during photo/aerial inspection work. The animal strike resulted in an accident.

4.4.44 Other

There were 51 occurrences of 'other' wildlife events of which 11 were accidents. There was

one fatality and three serious injuries and four minor injuries. Three were during photo/ aerial inspection operations resulting in one accident and two incidents.

Class 6. Consequential Actions

Forced Landing

4.4.45 Injury

Forced landings occurred 100 times of which 25 were accidents, 21 were serious incidents and 54 listed as incidents. Five serious injuries were the result of these occurrences with 12 minor injuries.

4.4.46 Emergency Evacuation, Survival & Search and Rescue

Emergency evacuation, survival, search and rescue had no reported occurrences in the reporting period.

Fatigue as a special consideration

4.4.47 Flight duties and CAO 48.1. Within the aviation industry in Australia (at time of writing), fatigue management by aviation organisations is reflected in Civil Aviation Order 48.1 which relates to flight time limitations, duty periods and rest periods. Organisations can apply to CASA for specific fatigue risk management measures which are more flexible than CAO 48.1 provided the organisation can demonstrate that their operations and scheduling and concomitant duty/rest periods allow for adequate fatigue management and tracking.

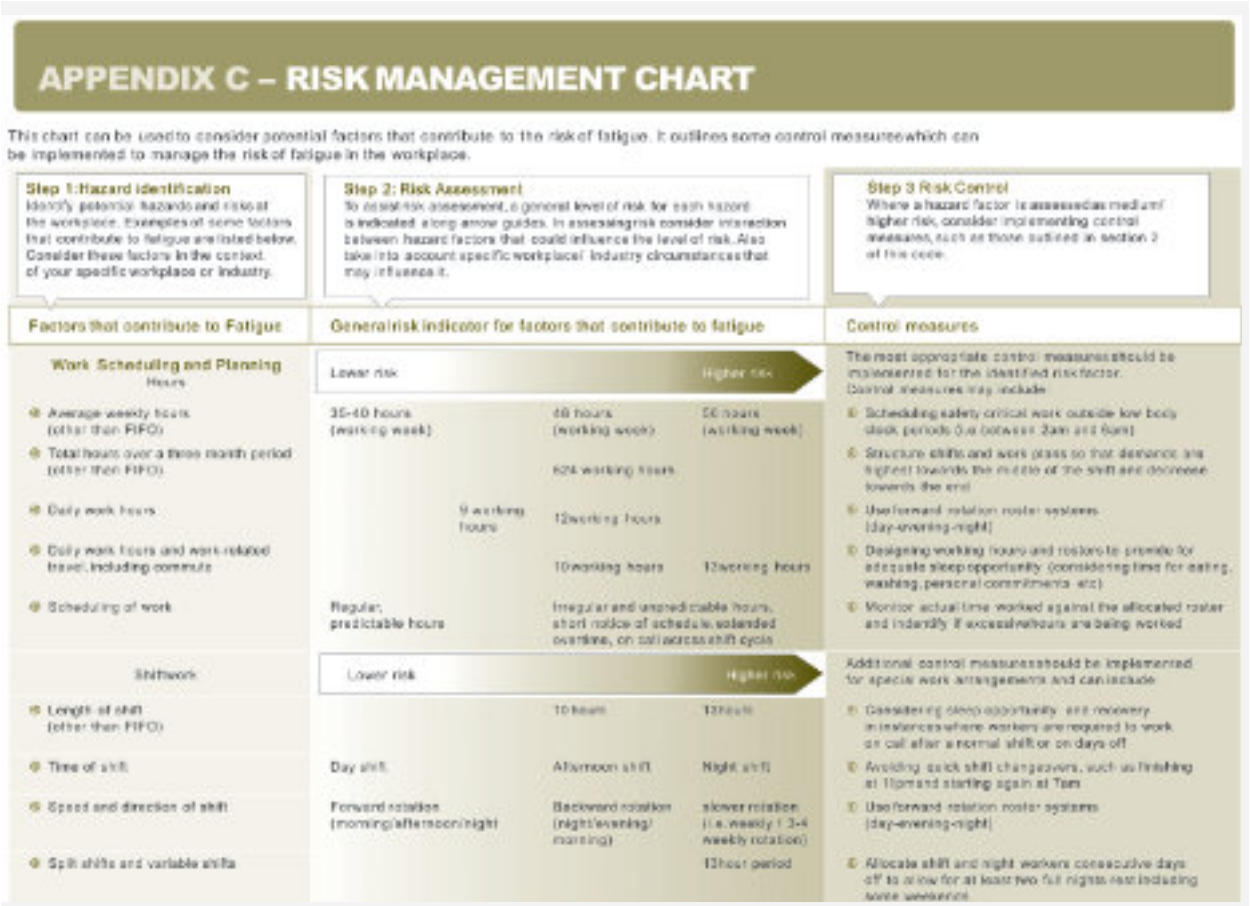
4.4.48 Special travel situations related to aerial inspection work. In some cases, the MC or AOB may complete his or her part in the inspection campaign at a location some distance from his or her home. This may necessitate a long drive which may come at the end of a day's flying. The Safe Work Australia *Guide for Managing the Risk of Fatigue at Work* advises to use the principles of risk management (eliminate, transfer, control) to counter the threat of fatigue.[8] To mitigate this special situation the NSW Government's Work Cover *Driver Fatigue Management Verification Tool* publication[9] has been used as a guideline for effective fatigue risk management for the situation described above (ie where a person must drive a significant distance after conducting flight duties).

4.4.49 The basis of the verification tool. The document relates to full-time truck haulage roles but breaks down the various shift types into high risk, medium risk and low risk based on driving duty hours and work scheduling. The NSW Government's *Transport for NSW response to: Effective fatigue management: Issues paper*,[10] cites that:

- fatigue-related crashes are twice as likely to be fatal -drivers who are asleep can't brake
- from 2013 to 2017, more people in NSW died in fatigue-related crashes than drink-driving crashes
- being awake for around 17 hours has a similar effect on performance as a blood alcohol content of 0.05.[11]

Furthermore, with regard to fatigue and driving statistics derived from a study of 300 commercial heavy vehicle shifts and laboratory research, it goes on to say:

- the greatest risk of an increase in drowsiness occurs for shifts longer than 12 hours with at least a twofold increase in drowsiness events [12]



APPENDIX C – RISK MANAGEMENT CHART

This chart can be used to consider potential factors that contribute to the risk of fatigue. It outlines some control measures which can be implemented to manage the risk of fatigue in the workplace.

Step 1: Hazard identification
Identify potential hazards and risks at the workplace. Examples of some factors that contribute to fatigue are listed below. Consider these factors in the context of your specific workplace or industry.

Step 2: Risk Assessment
To assist risk assessment, a general level of risk for each hazard is indicated along arrow guides. In assessing risk consider interaction between hazard factors that could influence the level of risk. Also take into account specific workplace/ industry circumstances that may influence it.

Step 3 Risk Control
Where a hazard factor is assessed as medium/ higher risk, consider implementing control measures, such as those outlined in section 3 of this code.

Factors that contribute to Fatigue	General risk indicator for factors that contribute to fatigue			Control measures
Work Scheduling and Planning Hours	Lower risk		Higher risk	The most appropriate control measures should be implemented for the identified risk factor. Control measures may include
Average weekly hours (other than FIFO)	35-40 hours (working week)	48 hours (working week)	56 hours (working week)	Scheduling safety critical work outside low body clock periods (i.e. between 2am and 6am)
Total hours over a three month period (other than FIFO)		624 working hours		Structure shifts and work pace so that demands are highest towards the middle of the shift and decrease towards the end
Daily work hours	9 working hours	12working hours		Use forward rotation roster systems (day-evening-night)
Daily work hours and work related travel, including commute		10working hours	12working hours	Designing working hours and rosters to provide for adequate sleep opportunity (considering time for eating, washing, personal commitments etc)
Scheduling of work	Regular, predictable hours	Irregular and unpredictable hours, short notice of schedule, extended overtime, on call across shift cycle		Monitor actual time worked against the allocated roster and identify if excessive hours are being worked
Shiftwork	Lower risk		Higher risk	Additional control measures should be implemented for special work arrangements and can include
Length of shift (other than FIFO)		10 hours	12hours	Considering sleep opportunity and recovery in instances where workers are required to work on call after a normal shift or on days off
Time of shift	Day shift	Afternoon shift	Night shift	Avoiding quick shift changeovers, such as finishing at 11pm and starting again at 7am
Speed and direction of shift	Forward rotation (morning/afternoon/night)	Backward rotation (night/evening/ morning)	slower rotation (i.e. weekly / 3-4 weekly rotation)	Use forward rotation roster systems (day-evening-night)
Split shifts and variable shifts			12hour period	Allocate shift and night workers consecutive days off to allow for at least two full nights rest including some weekends

Guidance from Work Safe Australia, such as the fatigue risk assessment above, along with NSW Work Cover driver fatigue management verification tool and CAO 48.1 were used to create a DPE fatigue management guideline.

The verification tool prescribes the circumstances for what is considered 'low risk' driver fatigue conditions, which are: [13]

- regular schedules (ie work periods)
- schedules that allow time for delays
- schedules that avoid the hours between 10pm and dawn
- at least one week's notice of schedule changes
- short frequent breaks are available during a work period
- workers sleep in their own bed at night
- workers get the opportunity for seven to eight hours sleep per night
- schedules are predictable.

Notwithstanding the point regarding sleeping in one's own bed, all of the above points can be accommodated in an aerial inspection program. This is then compared to the Safe Work Australia fatigue risk management risk assessment diagram shown above.[14]

4.4.50 DPE fatigue management guidelines. In consultation with the State Bush Fire Coordinator and Senior Bush Fire Officer coordinating the inspection campaign,[15] and with reference to the publications mentioned above, the following DPE Crown Lands fatigue management guidelines for aerial inspections of fire trails have been put in place. All mission crew are to follow the guidelines with any exceptions to be requested and authorised by the Senior Bush Fire Officer coordinating the program who is authorised to

accept risk at the medium level. The guidelines are as follows:

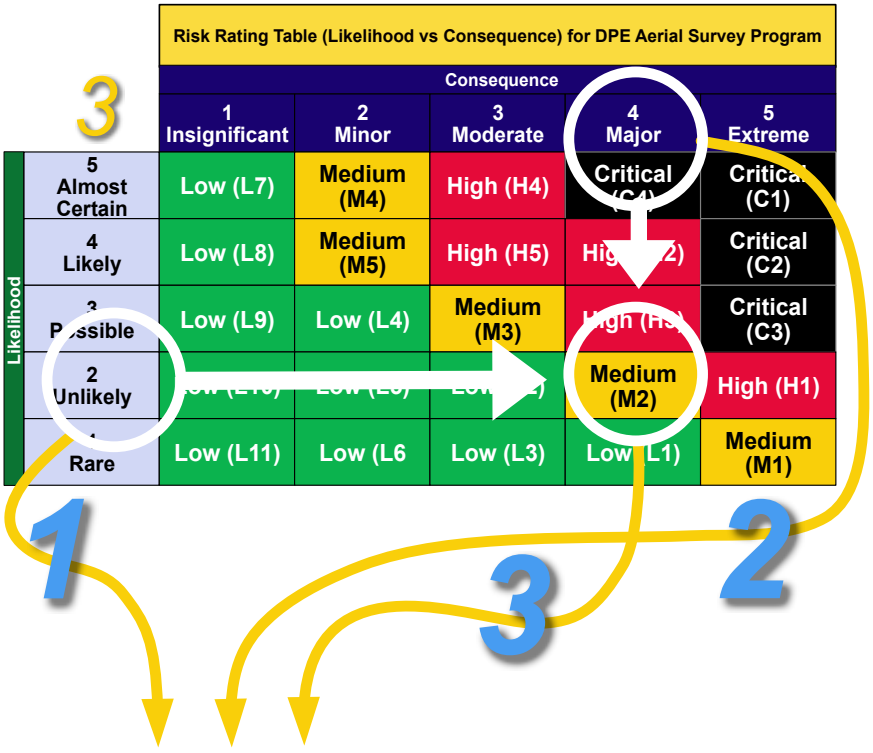
- a standard duty day will be not normally longer than 10 hours but can be extended to 12 hours by exception (eg to reposition to a home location)
- travel time to or from home location to position/reposition for/from duty shall be included as duty and shall not exceed 12 hours
- no travel to reposition from duty (ie to travel to a home location after a day's flying duty, for example) shall commence after 5pm local time unless authorised by the campaign coordinator (DPE personnel will be accommodated overnight so as to commence travel the following day)
- a flying hours limitation of 8 hours shall apply within a duty day.

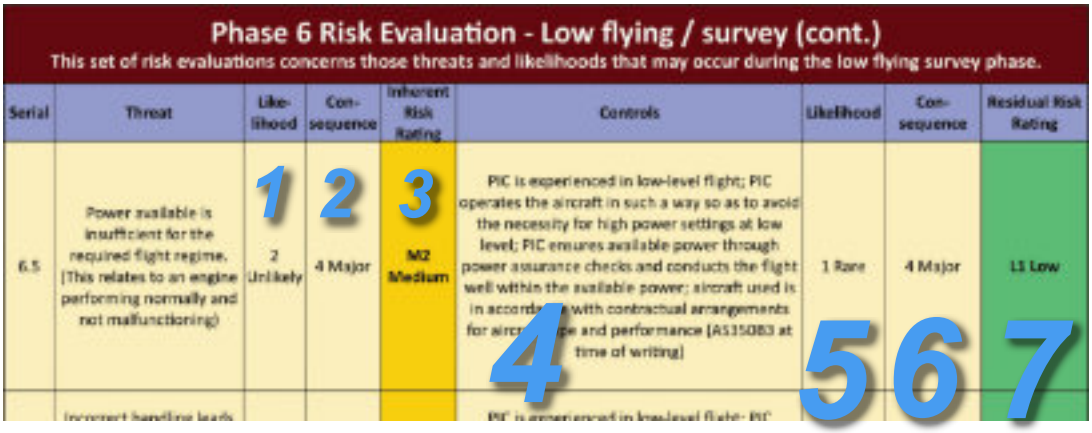
Crown Lands Risk Management

Risk management overview

In a nutshell, the risk management process is merely identifying a threat that may be encountered, assessing the likelihood that it will be realised (1) and the consequences if it does (2) and using a risk rating table that has been created based on the context determine the inherent risk rating (3). The risk rating is subjective and is reliant on people with knowledge of the context and the values of the organisation to determine the likelihood and consequence and the inherent risk rating and then who will take responsibility for the risk.

After applying controls (4) to mitigate the risk, the process is repeated and a new likelihood (5) and consequence (6) is considered which results in a lower risk rating called the residual risk rating (7).





Section 4.5: Risk evaluation through a risk register

4.5.1 Risk evaluation. The previous section saw risks — or more precisely, threats — analysed through data from the ATSB and related to the expected exposures for a typical DPE aerial inspection flight. The likelihood of a threat being realised is derived from statistical analysis. To evaluate the risk, and to ascertain at what level a risk can be accepted by an operator, or when it needs to be referred to a higher level for consultation and approval, a likelihood table and risk register can be created to help in achieving this task. A likelihood and consequence table can be used for potentially positive outcomes as well as for negative outcomes.

4.5.2 Residual risk ratings. For all the identified threats from the previous sections, an evaluation of their inherent risk has been carried out and shown on the risk evaluation tables which can be found in Part 7 of this manual and explained in the next part. An inherent risk score has been ascertained based on:

- industry knowledge
- ATSB database
- BITRE database
- conferring with DPE management personnel

and includes assessing the current controls in place as a part of normal business and the type of threat, the exposure to it, the likelihood that it will be realised as a negative event and the consequences if it does eventuate. The infographic at left provides details on this process. These threats and their inherent risk ratings are listed in a risk register which replicates the risk evaluation tables for ease of use and administration and updating.

4.5.3. Risk register. A risk register is a tool that enables an organisation to record and track data about threats and risks and the means by which they can be controlled. Stakeholders can be informed through the use of a risk register.[1] A risk register can also track other information such as who a risk owner might be or what controls can be put in place.

4.5.4 DPE risk register. The DPE uses risk management software to track threats and incidents. At time of writing, CAMMS Risk management cloud-based software (CAMMS stands for Collins, Anderson, Murfitt Management System, the names of the founders)[2] was the WHS reporting system that also tracked hazards within the department. Within Crown Lands, a risk register will reflect specific risks relevant to aerial inspection operations, including the risks being evaluated below.

4.5.5 Updating the DPE risk register. It is a requirement for all personnel within the department to ensure their own safety and the safety of those around them in accordance with the Work Health and Safety Act. Identifying hazards is one aspect of this responsibility and safe work practices are derived from identifying hazards and changing the circumstances surrounding the hazard or removing the hazard or educating people on how to deal with the hazard, which could be workplace methods or safety equipment or any number of ways to deal with a safety problem. As a part of the briefing/de-briefing, backbriefing process described in Part 6, hazards/threats can be identified and communicated amongst the crew, but also to the inspection campaign manager and coordinator who are responsible for the DPE Crown Lands aerial inspection of fire trails risk register. The register shall be reviewed at least annually or in accordance with departmental guidelines.

Endnotes - Part 4

Section 4.1

1. International Standards Organisation, *ISO 31000:2018 Risk Management - Guidelines*, ISO, Geneva, 2018, p. 11 – 12.
2. International Standards Organisation, *Guide 73:2009, Risk Management Vocabulary*, Geneva, 2009, para. 3.3.4.2.
3. Australian Government, *SIIMS Occurrence Type Coding Manual vers 1.3*, Australian Transport Safety Bureau, Canberra, 2014, p. 8
4. Australian Government, *SIIMS Occurrence Type Coding Manual vers 1.3*, Australian Transport Safety Bureau, Canberra, 2014, p. 8
5. NSW Government, *TPP 20-08 Internal Audit and Risk Management Policy for the General Government Sector*, NSW Treasury, Sydney, 2020, para. 1.2.2.

Section 4.2

1. International Standards Organisation, *Guide 73:2009, Risk Management Vocabulary*, Geneva, 2009, para. 3.3.2.3
2. NSW Government, *TPP 12-.3b Risk Management Toolkit for NSW Public Sector Agencies: Volume 1*, NSW Treasury, Sydney, 2012, s. 4.3.
3. NSW Government, *TPP 12-.3b Risk Management Toolkit for NSW Public Sector Agencies: Volume 1*, NSW Treasury, Sydney, 2012, p. 1
4. NSW Government, *Policy P7.1.10 Organisational risk management, vers 2.2*, NSW RFS, Sydney, 2019, p.9 - 14.
5. NSW Government, *Aviation Task Profile - Aerial Surveillance V2*, INT11/73611, Orange, 2022
6. Helisurveys, *Helisurveys Safe Work Method Statement - Low level surveys and aerial photography, HSSWMS-LL Surveys, Vers 4*, 15 Dec 2021. Jindabyne, 2021.
7. NSW Government, *TPP 12-.3b Risk Management Toolkit for NSW Public Sector Agencies: Volume 1, NSW Treasury*, Sydney, 2012, p. 1
8. NSW Government, *CAMMS Quick Reference Guide*, NSW Dept of Planning, Industry and Environment, Sydney, date unk, p.5-6
9. International Standards Organisation, *IEC 31010 Risk management - Risk assessment techniques, Edn 2*, Geneva, 2019
10. International Standards Organisation, *IEC 31010 Risk management - Risk assessment techniques, Edn 2*, Geneva, 2019, Clause B.10.3
11. International Standards Organisation, *IEC 31010 Risk management - Risk assessment techniques, Edn 2*, Geneva, 2019, Clause B.10.2

Section 4.3

1. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, Part 61 Flight crew licensing
2. Refer to contractor's CASA-approved operations manual and risk management documentation for specific requirements.
3. NSW Rural Fire Service, NSW and ACT Aviation Standard Operating Procedures, 2018 - Version 4.1, Sydney, 2018, S 2.1
4. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, s. 9.03
5. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 10.02 (e)
6. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.520
7. Reference vidoecon Conway Bown / Scott Vale SBFO / George Schneider SBFC of 9 Jun 22.
8. Reference vidoecon Conway Bown / Scott Vale SBFO / George Schneider SBFC of 9 Jun 22.
9. Reference vidoecon Conway Bown / Scott Vale SBFO / George Schneider SBFC of 9 Jun 22.
10. Civil Aviation Safety Authority, Civil Aviation Order 48.1 Instrument 2019 (as amended), Canberra, 2021, Appendix 1.
11. Civil Aviation Safety Authority, Civil Aviation Order 48.1 Instrument 2019 (as amended), Canberra, 2021, Appendix 1.
12. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 99.010
13. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 10.02 (a)
14. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 10.02 (b)
15. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 7.02 (1)
16. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 7.02 (1A)
17. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 7.03 (1) and (2)
18. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 9.02
19. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.565
20. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, Chapt 13

21. NSW Rural Fire Service, NSW and ACT Aviation Standard Operating Procedures, 2018 - Version 4.1, Sydney, 2018, Subsection 2.1
22. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.215
23. The operations manual of the contracted aviation service provider may not be specific about the qualifications of a member of DPE to perform the aerial survey task, however the spirit of the regulation is adhered to and the required training is exceeded when a member of DPE is trained as mission crew with a Working Safely Around Aircraft qualification or to such a standard as is acceptable to the DPE and to the contracted aviation service provider. Details of the minimum standards are outlined in CASRs Division 138.P.2 Task Specialists and the Part 138 MOS s 25. An aerial survey operation is considered a 'simple operation' and, as such, the PIC can assess competency as part of the pre-flight briefing and the operator must be satisfied that such a briefing can adequately cover the relevant procedures and that the task specialist is competent to carry them out (Part 138 MOS s 25.02 Note)
24. As discussed in contractor's safe work method statement and as per the requirements of Departmental risk assessment procedures.
25. A suitable means will normally be by Multimedia Messaging Service (MMS) whereby an image of the completed Mission Briefing Sheet is taken, or a PDF form is completed electronically, and sent to the risk owner (eg Snr Bushfire Officer, etc) for his/her oversight, record keeping, and to assist in planning.
26. NSW Rural Fire Service, NSW and ACT Aviation Standard Operating Procedures, 2018 - Version 4.1, Sydney, sub-section 2.3.
27. NSW Rural Fire Service, NSW and ACT Aviation Standard Operating Procedures, 2018 - Version 4.1, Sydney, sub-section 2.3.
28. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 10.02 (c)
29. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s 10.02 (d)
30. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, Divisions 26.12, 26.13.
31. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 10.02 (f)(i)
32. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 10.02 (f)(ii)
33. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 10.02 (g)
34. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.585, s. 91.590, s. 91.600, s. 91.610
35. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.805
36. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.060 (2)
37. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.485 (1) and (2) and (3)
38. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.470
39. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 19.05
40. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.465
41. As per the contractor's operations manual and any requirements detailed by the client for the survey.
42. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 19.04
43. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 10.02 (h)
44. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 10.03 / 10.05 / 10.06
45. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 15.08
46. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.550
47. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 24.03
48. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.380
49. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.375
50. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 11.20
51. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 11.21
52. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 11.22
53. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 2.07
54. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.265
55. As discussed in contractor's safe work practices
56. As discussed in contractor's safe work method statement
57. This includes ensuring that harnesses are secured; helmets are firmly fitted and visors down; gloves are

on (touchscreens are taken into account by use of styluses or other devices, otherwise gloves are donned and doffed as required but as seldom as possible); protective clothing is secured and loose fabric will not impede normal or emergency movements; footwear is secured; pens and other devices are secured and accessible as the need requires.

58. As discussed in contractor's safe work method statement

59. As discussed in contractor's safe work method statement

60. As discussed in contractor's safe work method statement

61. As discussed in contractor's safe work method statement

62. As discussed in contractor's safe work method statement

63. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, s 9.03 (3) and s 13.01 through s 13.09

64. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, s. 9.03

65. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, s. 9.03

66. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, s. 1.06

67. Civil Aviation Safety Authority, Part 138 (Aerial Work Operations) Manual of Standards 2020, Canberra, 2020, s. 1.06

68. Civil Aviation Safety Authority, Part 91 (General Operating and Flight Rules) Manual of Standards 2020, Canberra, 2021, s. 25.03

69. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.410

70. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.410 (3)

71. Civil Aviation Safety Authority AC 91-29 v1.0, Guidelines for helicopters - suitable places to take off and land, CASA, Canberra, 2021

72. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, 91.055

73. Civil Aviation Safety Authority, AC 91-29 v1.0, Guidelines for helicopters - suitable places to take off and land, CASA, Canberra, 2021, para 2.4.3.4

74. Civil Aviation Safety Authority, AC 91-29 v1.0, Guidelines for helicopters - suitable places to take off and land, CASA, Canberra, 2021, para 2.4.3.3

75. Civil Aviation Safety Authority, AC 91-29 v1.0, Guidelines for helicopters - suitable places to take off and land, CASA, Canberra, 2021, Part 6.

76. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.470

77. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.475

78. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.485

79. Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 Compilation No 93, CASA, Canberra, 2021, s. 91.485 provides further detail

80. Discussions by manager and coordinator of aerial inspection program with author.

Section 4.4

1. Bureau of Infrastructure, Transport and Research Economics, Australian Road Deaths Database - ARDD, https://www.bitre.gov.au/statistics/safety/fatal_road_crash_database, accessed 02 Jun 22.

2. Bureau of Infrastructure, Transport and Research Economics, Australian Road Deaths Database - ARDD, https://www.bitre.gov.au/statistics/safety/fatal_road_crash_database, accessed 02 Jun 22.

3. ATSB, Aviation Occurrence Statistics (rates update) 2010 t0 2019, AR-2020-047 Final, November 2020, Australian Transport Safety Bureau, Canberra, 2020, p.ii.

4. (ATSB statistics gathering changed for this period which allowed for a more thorough analysis of Australian aviation activities

5. Australian Transportation Safety Bureau, ATSB National Aviation Occurrence Database, https://www.atsb.gov.au - Aviation Occurrence Database accessed 10 May 22.

6. Australian Transportation Safety Bureau, ATSB National Aviation Occurrence Database, https://www.atsb.gov.au - Aviation Occurrence Database accessed 10 May 22.

7. Australian Transportation Safety Bureau, ATSB National Aviation Occurrence Database, https://www.atsb.gov.au - Aviation Occurrence Database accessed 10 May 22.

8. Safe Work Australia, *Guide for Managing the Risk of Fatigue at Work*, Canberra, 2013, p. 8 – 10

9. NSW Government, *Driver Fatigue Management Verification Tool*, WC05571, Work Cover, date unk

10. NSW Government, , unk.

11. NSW Government, *Transport for NSW response to: Effective fatigue management: Issues paper*, p.3.

12. NSW Government, *Transport for NSW response to: Effective fatigue management: Issues paper*, p.5.

13. NSW Government, *Transport for NSW response to: Effective fatigue management: Issues paper*, date unk, p.4.

14. Safe Work Australia, *Guide for Managing the Risk of Fatigue at Work*, Canberra, 2013, p. 16.

15. Videocon Conway Bown / Scott Vale SBFC / George Schneider SBFC of 09 Jun 22.

Section 4.5

1. International Standards Organisation, *IEC 31010 - International Standard - Risk management - Risk assessment techniques*, ISO, Geneva, 2019, p. 112

2. https://cammsgroup.com/workplace-health-and-safety/ accessed 22 May 22

Crown Lands Risk Management

Risk treatment strategies

Risk refers to the effect of uncertainty on objectives. It is not a negative term but relates to the chance of an event occurring, either positive or negative.

While most risk management is concerned with mitigating against negative outcomes, it can also be used to increase the chance of positive outcomes.

The diagram below looks at seven responses to risk, risk treatment strategies, from the ISO 31000 guidelines and how they align with the task verbs below.

Part 5: Risk treatment

Section 5.1: Overview

5.1.1 Risk treatment defined. The international standard describes risk treatment as an iterative process in that various solutions to treat a risk are trialled until the optimal solution is found. Each treatment is assessed and evaluated against benchmarks such as effectiveness, value, stakeholder acceptability, capability and timeliness. Selecting the best treatment then becomes finding the optimal level of effectiveness versus economics (time and cost). As Grant Purdy points out, if risk management is to be effective, then the process of assessing and treating risk must become part and parcel of an organisation's decision-making process.[1]

5.1.2 ISO options for risk treatment. ISO 31000 describes the options for treating risk as being:

- Avoiding risk by deciding not to start /continue the activity that gives rise to the risk
- Taking or increasing the risk in order to pursue an opportunity
- Removing the risk source
- Changing the likelihood
- Changing the consequences
- Sharing the risk with another party or parties (including contracts and risk financing)
- Retaining the risk by informed decision. [2]

The infographic at left shows how the seven risk treatment options can apply to risks in their positive and negative incarnations where risk treatment seeks to change the situation to the advantage of the person conducting the risk management.

5.1.3 A risk treatment plan. A risk treatment plan seeks to reduce the likelihood of a threat manifesting itself as a risk with a negative outcome or to increase the likelihood of an opportunity manifesting itself as a risk with a positive outcome. In essence the plan seeks to prevent a bad outcome and to facilitate a good outcome. If the outcomes do come to fruition, then the plan needs to mitigate the negative effects and enhance the positive effects. Ultimately, unless the risk of a threat with a negative outcome cannot be avoided, the risk must be accepted, but done so by informed decision-making and by a person with the appropriate level of responsibility and authority.

5.1.4 Risk treatment for the DPE aerial inspection program. There are a number of threats associated with the DPE aerial inspection program with consequences ranging from insignificant to major. The most critical threats involve fatalities, serious injuries or significant damage to equipment or property. All other risks are, for the most part, completely acceptable in terms of death or injury. When we consider the most critical threats we can encapsulate them into the following:

An impact of a vehicle/aircraft with the terrain (or another object) resulting in an uncontrolled exchange of energy causing injury or death.

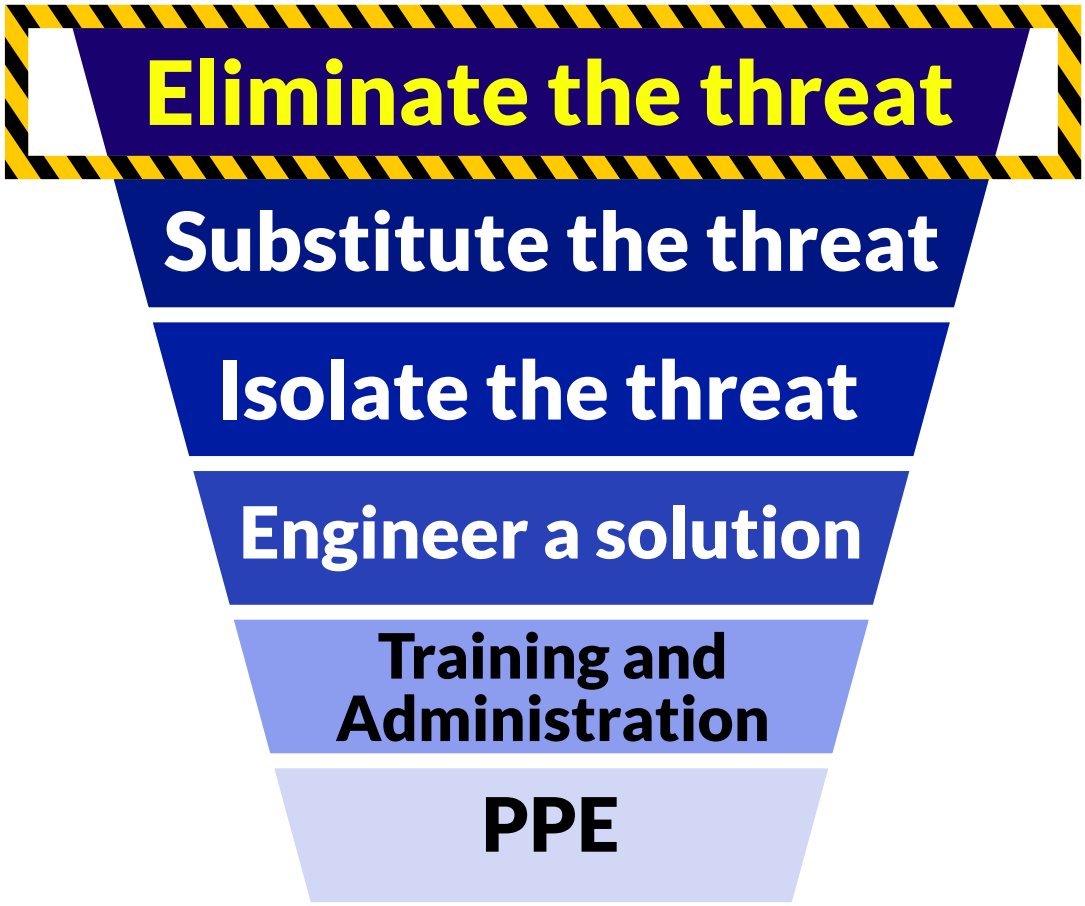
This 'catch-all' statement holds true for an aircraft impacting the terrain, or an obstacle on the terrain or in the air (eg ground, wire, bird, tower, tree, etc), or a vehicle impacting the terrain, or an obstacle on the terrain (eg another vehicle, tree, etc).

Crown Lands Risk Management

Risk controls

A risk control is a measure that can be taken to maintain or modify a risk, normally to the advantage of the person/organisation that is conducting the risk management.

There is a hierarchy of controls that may be used depending on the nature of the threat and its associated risk, and the availability of the controls. From most preferred at the top the controls decrease in efficacy the further down the list one goes.



Section 5.2: Controls

5.2.1 What is a risk control? A control is a measure that maintains and/or modifies risk. It could be any number of things as described in ISO 31000, which says:

> ***"they (controls) include, but are not limited to, any process, policy, device, practice, or other conditions and/or actions which maintain and/or modify risk. They may not always exert the intended or assumed modifying effect."***[1]

In other words, a control can take many forms; it is designed to cause an effect to a risk (usually to mitigate against negative risk); and may or may not be effective in the way it is expected to be.

5.2.2 DPE aerial survey risk. As discussed in the previous section, the majority of threats posed to an aerial survey will not result in death or injury. While they may result in delays or inefficiencies, very few will result in harm to a person. Those threats that may cause harm will most likely be due to an uncontrolled release of energy, usually a rapid deceleration too fast for the body to absorb. This could be in the form of an impact of the aircraft or vehicle with another object or a person impacting an object or an object impacting a person and the resultant release of kinetic energy into pulse energy that causes another object to lose its integrity, ie break or burn. In the case of a human being, the mechanism of injury can be classified into four key methods:

- high speed deceleration (ie impact)
- crush caused by the collapse of the capsule carrying the person (cabin)
- unrestrained objects hitting the person or unrestrained parts of a person hitting an object
- fire[2]

5.2.3 Assessing controls for the most serious case. The risk evaluation tables in Part 7 discuss possible threats and inherent risks and the relevant controls and residual risks for each identified threat. The most serious threat will be discussed now, and that is the possibility of an engine failure at low altitude resulting in an unsuccessful forced landing by the aircraft that, in turn, results in injury or death due to impact with the terrain which results in one or more of the four mechanisms of injury causing harm to an occupant of the aircraft.

5.2.4 Hierarchy of controls. The infographic at left shows the hierarchy of controls to treat risk. Assuming that the risk is of a threat becoming manifested into a negative outcome and the efficacy of the controls goes from highest at the top to least effective (but still effective) at the bottom.[3] They are:

- Eliminate the risk by removing the threat altogether or removing the human from the threat or not carrying out the activity which gives rise to the threat.
- Substitute the risk by using a different item that has a threat which is less potent. (This does not necessarily apply to our case, but it might in other contexts)
- Isolate the risk by physically separating the hazard from the human or reducing the number of humans exposed to the threat or the time exposed to the threat.

- Engineer a solution by replacing the human with an engineered alternative (eg automation or robotics) or engineer a safer method of doing the task so that a failure will not cause the threat to be realised
- Use administrative solutions such as rules and regulations to significantly reduce the threat or use training to educate people as to how the threat may manifest itself and what can be done to mitigate the consequences.
- Use Personal Protective Equipment to protect the human from the threat and any harm it may cause or reduce the harm it may cause.
-

5.2.5 Applying the hierarchy of controls to the key threat in an inspection program.

The most significant, albeit highly unlikely, threat to human life is unsuccessful forced landing due to engine failure at low altitude. If we are to apply the hierarchy of controls, it would look like this:

- Eliminate the threat: Do not conduct inspections by air. (Although driving is more dangerous than flying so the threat has been substituted, but adversely), or use remotely piloted aircraft to remove the human from exposure to the threat.
- Substitute the threat: Not possible in this case.
- Isolate the threat: Only conduct aerial inspections of fire trails in difficult terrain, or where ground inspections are difficult to achieve, or reduce the number of persons on board the aircraft who can conduct the inspections to two.
- Engineer a solution: Use a twin-engined aircraft that does not have a single-engine flight restriction in the event of the failure of one powerplant, or use remotely-

The risk evaluation tables provide a tabular format of identified threats for each phase of an inspection program/mission and their inherent risks followed by what controls are applicable and the resultant residual risk. The red circle shows the controls for each identified risk.
(Image by Conway Bown)

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparation (cont.)

This set of risk evaluations concerns those threats and likeliho[illegible] that may occur during the contractual arrangements and other preparations for an aeri[illegible]campaign.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.7	The number of DPE Crown Lands personnel who are physically and psychologically able to be trained are not sufficient, or, for the purpose of the campaign, there are not enough personnel available for all flights due to shortages or absences.	2 Unlikely	3 Moderate	L3 Low	Sufficient personnel are located and trained from various regions in the state. Management personnel remain current and recent to be able to backfill. Other agencies with the same skills can be called upon to fill crew positions on an ad hoc basis.	1 Ra[illegible]	3 Moderate	L3 Low
0.8	The aerial survey program generates interest from external stakeholders leading to requests for DPE to undertake further tasks which impacts on the survey program (aka mission creep constraints), or causes additional complexity (eg administrative restraints such as approvals, accommodation, travel arrangements, etc)	4 Likely	3 Moderate	H5 High	Aerial survey program plans for foreseeable constraints (eg PR) by integrating those activities into the program after ensuring it is resourced. Other non-essential requests are vetted and if deemed necessary, are planned for and resourced where possible or reported on where not to ensure financial transparency of costs associated with the program. Unnecessary or unresourced task requests are rejected with an explanation to the stakeholder. Stakeholder points of contact are identified early and specific SMART goals are given to those POCs to meet in a timely manner if the stakeholder wishes to utilise planned DPE resources.	3 Possible	3 Moderate	M3 Medium
0.9	Personnel involved with the DPE aerial survey program are not adequately trained leading to inefficiencies or significant safety infringements.	4 Likely	3 Moderate	H5 High	Personnel involved with the DPE aerial survey program are provided DPE approved training appropriate to their task which may include subjects such as mission command, Team Resource Management, Working [illegible]y Around Aircraft, Low Level Flyin[illegible] Hazards, Human Factors.	[illegible]nlikely	3 Moderate	L2 Low

piloted aircraft.

- Administration and Training: Use regulations, risk management, training in mission crew techniques and team resource management to enhance safety and educate personnel in how to spot when risk is being enhanced during an inspection flight and how best to avoid that situation.
- Use PPE to protect the human body from the mechanisms of injury.

5.2.6 Application of controls amends the inherent risk. By using controls to mitigate or eliminate the consequences of threats being realised means that the inherent risks in a threat is altered. The altered risk, known as residual risk, is what can be expected to occur after effective controls are in place and thus become the concern of the person accepting the risk. These shall be discussed in the next section.

Image by Lum3n - Pexels CC0

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparation (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the contractual arrangements and other preparations for an aerial survey campaign.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.7	The number of DPE Crown Lands personnel who are physically and psychologically able to be trained are not sufficient, or, for the purpose of the campaign, there are not enough personnel available for all flights due to shortages or absences.	2 Unlikely	3 Moderate	L2 Low	Sufficient personnel are located and trained from various regions in the state. Management personnel remain current and recent to be able to backfill. Other agencies with the same skills can be called upon to fill crew positions on an ad hoc basis.	1 Rare	3 Moderate	L3 Low
0.8	The aerial survey program generates interest from external stakeholders leading to requests for DPE to undertake further tasks which impacts on the survey program (aka mission creep constraints), or causes additional complexity (eg administrative restraints such as approvals, accommodation, travel arrangements, etc)	4 Likely	3 Moderate	H5 High	Aerial survey program plans for foreseeable constraints (eg PR) by integrating those activities into the program after ensuring it is resourced. Other non-essential requests are vetted and if deemed necessary, are planned for and resourced where possible or reported on where not to ensure financial transparency of costs associated with the program. Unnecessary or unresourced task requests are rejected with an explanation to the stakeholder. Stakeholder points of contact are identified early and specific SMART goals are given to those POCs to meet in a timely manner if the stakeholder wishes to utilise planned DPE resources.	3 Possible	3 Moderate	M3 Medium
0.9	Personnel involved with the DPE aerial survey program are not adequately trained leading to inefficiencies or significant safety infringements.	4 Likely	3 Moderate	H5 High	Personnel involved with the DPE aerial survey program are provided DPE approved training appropriate to their task which may include subjects such as mission command, Team Resource Management, Working Safely Around Aircraft, Low Level Flying Hazards, Human Factors.	2 Unlikely	3 Moderate	L2 Low

When assessing risks, the inherent risk (circled in red) is the risk as it stands before any new controls are put in place. Once controls are in place, the residual risk (circled in blue) is what remains. For example, the rules about driving intoxicated are already in place and so the likelihood that someone may do so is possible and the consequences (an accident) are moderate to high, and the inherent risk is therefore medium. Put in place an extra control such as random drug and alcohol testing and a widespread education campaign and it reduces the likelihood from possible to unlikely creating a residual risk rating of low.
(Image by Conway Bown)

Section 5.3: Inherent and residual risk

5.3.1 **Inherent vs residual risk.** Residual risk can be differentiated from inherent risk in that controls have been deliberately put in place to mitigate potential negative outcomes. In a modern work environment there are few risks that do not already have some sort of controls already in place. It could be something as simple as signage indicating that the floor was wet... or perhaps an induction brief before people walk onto a factory floor.

5.3.2 So inherent risk would be the risk level as it currently stands assuming that there are already some forms of controls in place rather than a hypothetical instance where absolutely no controls exist (which would be exceedingly rare). Residual risk is the level of risk that remains after specific controls are put in place to mitigate identified risks, discussed in the next section.

5.3.3 **DPE aerial inspection risks**. The risk evaluation tables contained in the appendices in Part 7 show each assessed inherent risk, and its risk rating before controls are put in place. The controls are then enacted and the inherent risk becomes modified into a residual risk with a different risk rating. If controls are not put in place and the inherent risk is not modified, then the residual risk does not apply. In that case the residual risk IS the inherent risk and the risk rating remains unchanged. For all identified risks associated with the DPE aerial inspection program, each risk has at least one control that can be put in place to modify it into a residual risk.

Risk escalation and action for DPE Crown Lands aerial inspection program If, upon applying the relevant controls to an inherent risk (if possible), the residual risk rating will require risk acceptance by the responsible approval authority as indicated below.			
Risk Rating	**Escalation and Reporting to**	**Response or Action**	**Approval Authority**
CRITICAL	Report immediately to the Approving Authority prior to the activity commencing and then ongoing reporting as directed by the Approving Authority. Chief Exec/ARC: Quarterly, if the risk is ongoing	Immediate action is required to eliminate the risk or reduce its likelihood/consequences. Refer to the hierarchy of controls (Section 5.2). Activities that expose workers to this level of risk require approval by the Approving Authority for critical risks.	Executive Director
HIGH	Report immediately to the Approving Authority prior to the activity commencing and then ongoing reporting as directed by the Approving Authority. Chief Exec/ARC: Quarterly, if the risk is ongoing	Immediate action is required to eliminate the risk SFARP or reduce its likelihood / consequences. Refer to the hierarchy of controls (Section 5.2). Activities that expose workers to this level of risk require approval by the Approving Authority for risks rated as high.	Program Manager (Normally SBFC)
MEDIUM	Report immediately to the Approving Authority prior to the activity commencing and then ongoing reporting as directed by the Approving Authority. Chief Exec/ARC: Bi-annually and during routine risk reviews and audits	Immediate action is required to eliminate the risk SFARP or reduce its likelihood / consequences. Refer to the hierarchy of controls (Section 5.2). Activities that expose workers to this level of risk require approval by the Approving Authority for risks rated as medium.	Program Coordinator (Normally the Responsible SBFO)
LOW	Report to the Approving Authority routinely (eg during backbriefs) to confirm risk levels remain as assessed, or as directed by the Approving Authority. Chief Exec/ARC: Annually and during routine risk reviews and audits	All workers are to ensure that likelihood, consequences and risk levels remain as assessed through the constant use of controls. Any deviations require a new risk assessment.	Mission Crew (reporting to Program Coordinator)

Section 5.4: Responsibilities

5.4.1 Risk ownership. Each level of risk requires ownership by an appropriate person who is able to make relevant decisions for the activity. The following resposibilities apply to the DPE aerial inspection program.

5.4.2 Risks assessed as critical. The Executive Director Land and Asset Management has overall risk ownership for risks relating to the aerial inspection of fire trails program that may be assessed as critical after applying controls. These risks should be reviewed as often as practical as determined by the risk owner, and reviewed by the audit and risk committee and the Chief Executive on at least a quarterly basis if not more often if the risk is ongoing and cannot be mitigated. As at time of writing there were no identified risks that had a residual rating of critical.

5.4.3 Risks assessed as high. The State Bush Fire Coordinator, as the owner of the DPE aerial inspection program, has risk ownership for residual risks assessed as high. At time of writing, there were some risks that had an inherent risk rating or high, however if controls are put in place, the residual risk ratings are downgraded to medium or low. An instance when the SBFC would need to be consulted to accept a high level risk would be when a new risk was identified that had a residual risk rating of high, or if a risk with an inherent risk rating of high exists and the applicable controls, for whatever reason, could not be applied leaving the residual risk as being high.These risks should be reviewed as often as practical as determined by the risk owner, and reviewed by the audit and risk committee and the Chief Executive on at least a quarterly basis if not more often if the risk is ongoing and cannot be mitigated.

5.4.4 Risks assessed as medium. The Senior Bush Fire Officer who is responsible for the coordination of the aerial inspection program has risk ownership for residual risks assessed as medium. At time of writing, the only risks with a residual risk rating of medium were in Phase 0, the planning and coordination phase of the program, which is under the responsibility of the SBFO as program coordinator. He or she would normally accept the risk at that level. Should a risk be identified by the operating crew as having a residual rating of medium, it should be referred immediately to the SBFO (coordinating the program) for review and acceptance or rejection. Medium-level risks should be reviewed as often as practical by the program owner but at least bi-annually and whenever the audit and risk committee conducts its reviews.

5.4.5 Risks assessed as low. The Mission Commander and mission crew who execute the individual flights have ownership of all risks rated as low. At time of writing, all operational risks had residual risk ratings of low, however if a risk that is medium or high cannot have its controls put in place, or if a new risk is identified with a residual rating of medium or higher, the MC and crew must escalate the risk higher to the SBFO (coordinating) or the SBFC. These risks must be monitored by the mission crew and reported to the SBFO (coordinating) as part of the mission authorisation brief and back brief. The SBFO (coordinating) is responsible for updating the risk register and, with the SBFC, review the risks and report annually to the Executive Director.

Endnotes

Section 5.1

Section 5.2

1. ISO, ISO 31000:2019, para 3.8
2. These four mechanisms of injury were determined by a US Army study of 298 helicopter crashes and their investigations.
3. The origin of the hierarchy of controls is unclear, but they have been ratified by the US National Institute for Occupational Safety and Health. The US version has five controls whereas outside North America, a sixth control - isolation - is often added as a discrete control measure. https://www.cdc.gov/niosh/topics/hierarchy/default.html

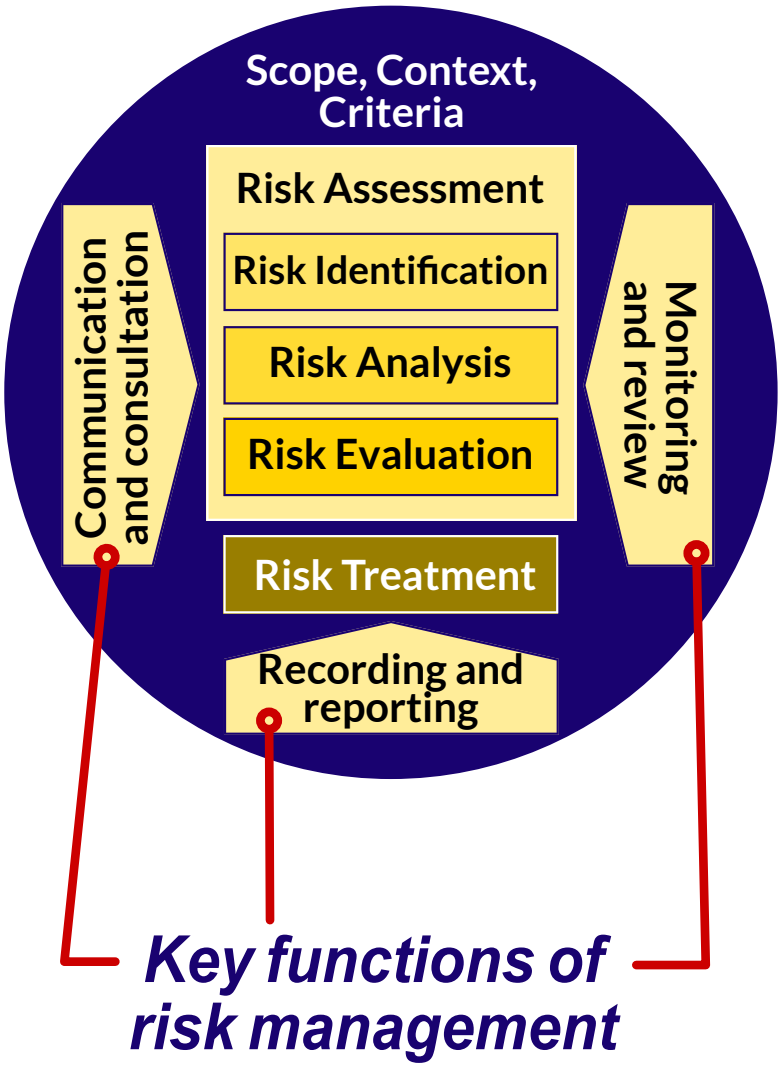
Image by Conway Bown

Crown Lands Risk Management

Communication, monitoring and recording

The diagram below shows the concept of the risk management process. Key functionsto the actual risk assessment is the communication and the consultation processes and the monitoring and review. The risk treatment component of the process is also monitored carefully and recorded and reported on.

DPE aerial survey flight crews can adhere to the principles of risk management by ensuring that there is an ongoing flow of communication between crew members (laterally) and upwards and downwards to and from DPE management. Likewise, DPE management ensures that activities are provided oversight and review and that key events, risks, hazards and the like are recorded and reported on.



Part 6: Communicating and reviewing
Section 6.1: Overview

6.1.1 Overview. Interpersonal communication is governed by four key principles, namely:

- It is inescapable - everything a person does in any given interaction with another person contains some element of communication, either consciously or sub-consciously. Facial expressions, gestures, body language, tone of voice, are all forms of communication and can contextualise a message. Even the act of deliberately NOT communicating communicates a message, either intentional or not.
- It is irreversible - once a message has been sent and received it will have an effect, regardless of the best efforts of the sender or anyone else in authority.
- It is complicated - regardless of how simple we try to make it. Individuals have filters which form barriers to communication that messages have to negotiate.
- It is contextual - it relies on common frames of reference all of which will help decipher meaning.

Mission crew must understand the importance of communication between themselves in a team environment, and with those outside the team environment who will be relying on good communication to manage situations, especially when those people are geographically removed from the team (eg Crown Lands management who oversee the program).

6.1.2 Communication flow. During an aerial inspection, communication will flow between the mission commander and the PIC and between the mission commander the the entire aerial inspection team. Furthermore, the mission commander will also ensure that management is informed before and after a flight of what the intended aims are and what was achieved respectively, and any lessons learnt through the flight authorisation form. This is an important part of complying with best practice risk management.

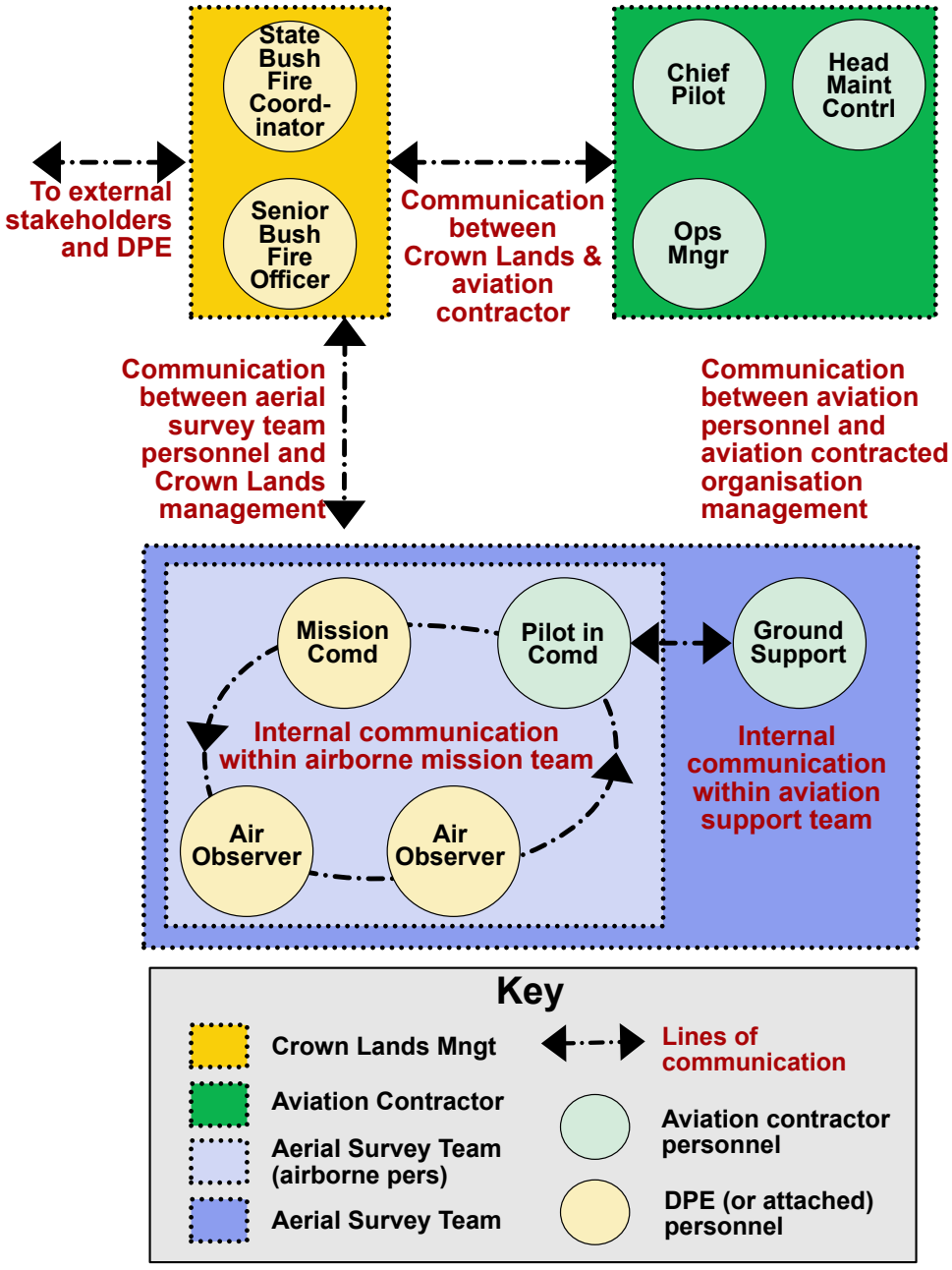
6.1.3 Review. Reviewing an activity and learning from it is vital for increasing efficiencies and decreasing risk. The first review is in the form of a team de-brief after the mission and then when the mission commander back-briefs Crown Lands management/ campaign coordinator.

Reviewing lessons learnt is fundamental to risk management. New risks can be recorded in the risk register and appropriate controls put in place. Likewise, if some risks become irrelevant over time, then those risks can be adjusted in the risk register or removed altogether.

Communications flow

Aerial survey program internal context

Communication flow in complex activities is critical to ensure efficiency and safety. Within the DPE aerial survey program for Crown Lands, the communication flow between Crown Lands management and the survey team operating in the field and the aviation contractor providing the aviation capability must be unhindered. Risk management activities and briefing/de-briefing rely on constant and consistent communication. The diagram below shows the flow of information between the three key communicators.



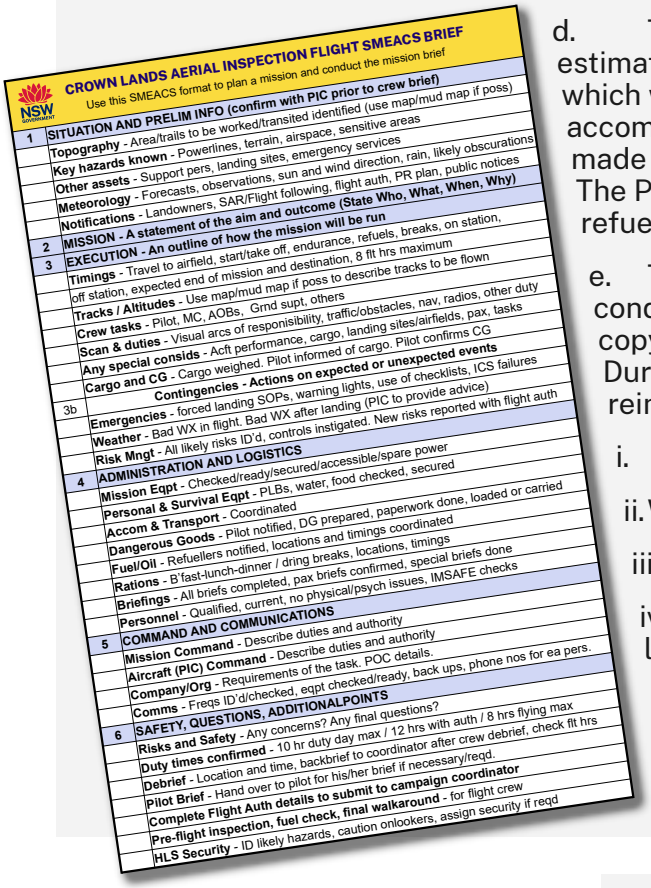
Section 6.2: Briefing laterally

6.2.1 Pre-mission briefing. For the purpose of aerial inspection tasks, a lateral briefing can be considered to be a form of communication between members of a team. It will normally take the place of the mission commander conducting the pre-mission brief using the SMEACS format. The briefing process would proceed more-or-less as follows:

a. The mission commander obtains details of what trails need to be inspected next as part of the aerial inspection campaign. This may have already been provided to him or her or it may need to be confirmed by the campaign coordinator, normally the Senior Bush Fire Officer, or the State Bush Fire Coordinator. Changes to the program may have occurred due to unforeseen circumstances, so the mission commander would ascertain what the priorities are from the SBFO or SBFC which would form the basis of the pre-mission planning.

b. The PIC would access the information he or she requires as per CASRs and in accordance with the planned aerial inspection aims. NOTAMS, weather, details on aerodromes, refuelling details all contribute to his or her planning for the day's flying.

c. The mission commander and PIC discuss the requirements for the day and verify that they are achievable based on the variables for which each has responsibilities. For example, flying from east to west on a fire trail may be inadvisable due to strong easterly winds, so reversing the direction may be more prudent, however this may have the aircraft flying into a rising sun making visibility more difficult. The mission commander may advise that that trail can wait until later in the day and perhaps they can collect the data on the return to base. These are some of the considerations that need to be made as part of the plan.



	CROWN LANDS AERIAL INSPECTION FLIGHT SMEACS BRIEF Use this SMEACS format to plan a mission and conduct the mission brief
1	**SITUATION AND PRELIM INFO (confirm with PIC prior to crew brief)**
	Topography - Area/trails to be worked/transited identified (use map/mud map if poss)
	Key hazards known - Powerlines, terrain, airspace, sensitive areas
	Other assets - Support pers, landing sites, emergency services
	Meteorology - Forecasts, observations, sun and wind direction, rain, likely obscurations
	Notifications - Landowners, SAR/Flight following, flight auth, PR plan, public notices
2	**MISSION - A statement of the aim and outcome (State Who, What, When, Why)**
3	**EXECUTION - An outline of how the mission will be run**
	Timings - Travel to airfield, start/take off, endurance, refuels, breaks, on station, off station, expected end of mission and destination, 8 flt hrs maximum
	Tracks / Altitudes - Use map/mud map if poss to describe tracks to be flown
	Crew tasks - Pilot, MC, AOBs, Grnd supt, others
	Scan & duties - Visual arcs of responisibility, traffic/obstacles, nav, radios, other duty
	Any special consids - Acft performance, cargo, landing sites/airfields, pax, tasks
	Cargo and CG - Cargo weighed. Pilot informed of cargo. Pilot confirms CG
3b	**Contingencies - Actions on expected or unexpected events**
	Emergencies - forced landing SOPs, warning lights, use of checklists, ICS failures
	Weather - Bad WX in flight. Bad WX after landing (PIC to provide advice)
	Risk Mngt - All likely risks ID'd, controls instigated. New risks reported with flight auth
4	**ADMINISTRATION AND LOGISTICS**
	Mission Eqpt - Checked/ready/secured/accessible/spare power
	Personal & Survival Eqpt - PLBs, water, food checked, secured
	Accom & Transport - Coordinated
	Dangerous Goods - Pilot notified, DG prepared, paperwork done, loaded or carried
	Fuel/Oil - Refuellers notified, locations and timings coordinated
	Rations - B'fast-lunch-dinner / dring breaks, locations, timings
	Briefings - All briefs completed, pax briefs confirmed, special briefs done
	Personnel - Qualified, current, no physical/psych issues, IMSAFE checks
5	**COMMAND AND COMMUNICATIONS**
	Mission Command - Describe duties and authority
	Aircraft (PIC) Command - Describe duties and authority
	Company/Org - Requirements of the task. POC details.
	Comms - Freqs ID'd/checked, eqpt checked/ready, back ups, phone nos for ea pers.
6	**SAFETY, QUESTIONS, ADDITIONALPOINTS**
	Risks and Safety - Any concerns? Any final questions?
	Duty times confirmed - 10 hr duty day max / 12 hrs with auth / 8 hrs flying max
	Debrief - Location and time, backbrief to coordinator after crew debrief, check flt hrs
	Pilot Brief - Hand over to pilot for his/her brief if necessary/reqd.
	Complete Flight Auth details to submit to campaign coordinator
	Pre-flight inspection, fuel check, final walkaround - for flight crew
	HLS Security - ID likely hazards, caution onlookers, assign security if reqd

d. The Mission Commander and PIC may make an estimate on how far they may get on that day's flights which will have an impact on the location for their accommodation for that night. A 'best guess' can be made which can then be confirmed later in the day. The PIC and the ground support can plan likely refuelling locations.

e. The Mission Commander gathers the team and conducts the SMEACS brief (see Chapter 7 for a copy and an explanation of a SMEACS brief). During the brief, the mission commander reinforces key safety and team concepts, such as:

i. Who is in charge of the mission

ii. Who is in charge of the aircraft

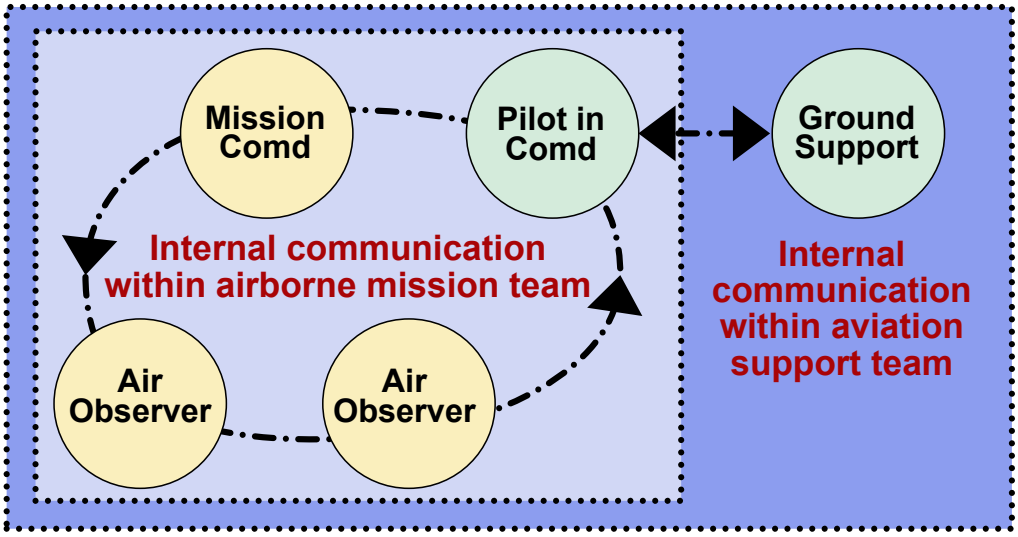
iii. Responsibilities of each team member

iv. Visual arcs of responsibilities for looking out for hazards

v. An outline of how the day will progress and which trails will be inspected

vi. Confirmation of logistics such as

The Mission Commander conducts a pre-mission crew brief with all the members of the team using the SMEACS format. If not all the members of the team are present, then those members should be given their own brief, also. Note how the crew are wearing their helmets? This should be avoided as it is a barrier to clearly hearing the brief. Picture by Conway Bown



The communication flow within the airborne mission team must be constant and relevant. No member of the aviation team can feel as though they are not free to speak up. Communication between the PIC and ground support ensures efficiency of operations. Image by Conway Bown

The Mission Commander and the PIC need to be able to work seamlessly. Authority for the mission lies with the Mission Commander but authority for the safe and legal operation of the aircraft always remains with the PIC. Communication between the MC and PIC must be ongoing and unambiguous. Any points that are unclear need to be clarified immediately. Picture by Conway Bown

accommodation, meals, refuels

vii. Confirmation that the team is fit and healthy to perform the day's tasks

viii. Any concerns that team members may have, or issues relating to safety.

6.2.2 Pilot briefing. It is a CASA requirement that the PIC be responsible for pre-flight safety briefings. He or she can delegate that to an appropriately qualified person, however the onus is on the PIC. The safety briefing need not occur before each sortie if it is the same crew, same aircraft and same mission profile each day, however if there is a significant change to any of the above, then it is prudent to conduct a new safety briefing. The briefing should be carried out at the aircraft and free from any distractions. The next paragraph discussed these types of barriers to communication.

6.2.3 Removing barriers to communication. The mission commander must ensure that his or her message is getting through to the other team members in the manner in which it is intended. Barriers to communication will skew or interfere with the message and must be anticipated and overcome. Barriers can be:

- Physical - such as noise, heat, distractions, cold, wind, other people
- Physiological - such as a person's level of hearing, vision (usually not a problem in this environment), a malady such as a headache or toothache or some other physiological distraction
- Psychological - such as language and jargon that is not commonly shared; perceptions of authority or lack of authority; hierarchical organisational structure.

Image by Conway Bown

Ideally, the pre-mission briefing establishes the mission commander's authority amongst all team members and the PIC's authority insofar as the aviation component is concerned. Furthermore, the briefing should be conducted somewhere where distractions are minimised and where it is comfortable and easy to hear. The Mission Commander should not use jargon that is not understood by all, and likewise the PIC should be encouraged to explain any terminology that he or she uses as part of the PIC part of the brief.

Remember! There is no such thing as a stupid question... just stupid mistakes. So encourage everyone to speak up if something is unclear.

6.2.4 Post-mission de-briefing. An often overlooked aspect of communications is the post-mission de-briefing. Oftentimes, events occur or situations arise that are noted by one member of the team — or which may have caused an issue — but the team has resolved to sort it out after the mission. Or perhaps a key lesson that is noteworthy has been learnt. The post-mission de-brief allows for a forum for any point to be raised and worked out or recorded. This function is also explained in section 6.4.

Photo by Andrea Piacquadio - CC0 - Pexels

CROWN LANDS AERIAL INSPECTION FLIGHT AUTHORISATION FORM

Complete as much of this form as possible prior to the crew brief. After the crew brief, complete the remainder of this form and send it (or an image of it) to the campaign coordinator.
If sent electronically, save as YYMMDD_Flight_Auth_Brief and then email it

Mission No or area to be worked		**Date** (YYMMDD)	
Mission Commander (Name and ph no)		**Pilot in Command** (Name and ph no)	
Air Observer 1 (Name and ph no)		**Air Observer 2** (Name and ph no)	
Other crew/pax (Name and ph no)		**Ground Support Pers** (Name and ph no)	
Crew Inspection Day		**Handover required at end of day?**	
Media?		**If yes, location and approx time**	

Trails to be inspected

Anticipated landing sites			
Reason for landing			
Weather			

Any risk management or safety issues

Any administrative issues or requests

Is the crew fit for the mission?		**Are all briefings complete?**		**Will a duty day extension be requested?**	

Backbrief information (complete this section after flying, save it and email it to campaign coordinator**)**

Handover completed		**Did the mission/s run as planned?**		**Hours flown** (verify with PIC)	

Provide a word picture on any issues that management needs to be aware of

Form created by IPAS. Comments to conway@ipas.com.au

Section 6.3: Briefing upwards

6.3.1 Management decision-making is based on good information. A manager of an activity accepts the risk for that activity. He or she must make decisions which can only be done on the basis of good information. Decisions may be made to solve immediate problems, or for issues that may have an impact later on. It is of vital importance that managers and supervisors be constantly updated on the progress of an activity, especially in the beginning phases when experience is low or objectives and capabilities are unclear or yet to be fully appreciated. It is a legal requirement of the WHS Acts (C'th and NSW) that managers be updated on any hazards that have been identified.1 A flight authorisation brief and the backbrief provide a means of fulfilling this responsibility. Once an activity is underway, and operators have proven themselves capable of making ongoing operational decisions, the amount of information and the frequency of reporting may be curtailed.

6.3.2 Mission commander responsible for keeping Crown Lands management informed. As an aerial inspection campaign gets underway, especially when new crews or a new contractor are involved, the campaign coordinator and manager — normally the SBFO and the SBFC — will need to be assured that operations are smooth and trouble-free. The SBFO and SBFC may have hands-on involvement with logistics or coordination with stakeholders, so keeping them appraised of any issues, and being able to foretell what problems may arise or what administrative needs must be met, allows the management team to be proactive. An easy way of doing this is via an authorisation brief.

> **A manager must make decisions which can only be done on the basis of good information.**

6.3.3 Flight authorisation briefing form. A flight authorisation brief, or 'auth brief', is a brief to a manager or to a person who might be providing oversight for an activity. It provides him or her an outline of what is to be done as part of the activity and an assurance that all the prerequisite functions have been carried out. For example, in the case of a fire trail aerial inspection flight, prerequisite functions are such things as obtaining up-to-date weather, or ensuring that all crew members are fit for duty, or that the risk assessment is valid. The manager can then be confident that the activity is on track and that it is being managed by the mission commander in accordance with expectations.

6.3.4 Flight authorisation brief form and its use. To assist with the upwards briefing, a flight authorisation brief proforma has been developed which not only facilitates the upwards briefing, but also provides a means of tracking each day's anticipated flights. An example of an 'auth brief' is above. The auth brief not only provides details of the mission to the inspection campaign manager, it can also serve as a passenger manifest, briefing notes for the pre-mission crew brief, flight note for SARTIME (if necessary) and also has a backbrief field.

6.3.5 Using the 'flight auth brief' form. Prior to the day's activities and the pre-flight briefing, the mission commander would determine what needed to be achieved for that

1. For further details on the responsibilities of workers with regard to consulting with management see paragraph 2.1.4

day: which trails needed to be inspected or what directed activites (eg media flight) had to be completed. It might go something like this:

a. He/she would come up with an outline plan to achieve the day's aims.

b. MC discusses plan with PIC. PIC Checks weather and NOTAMS.

c. MC fills in first half of auth brief (mission no/descr, date as YYMMDD, crew names and contact phone nos, any pax names and phone nos, departure point, ETD, intended landing point at end of mission, intended trails to be inspected, likely intermediate landing points.

d. MC (or PIC) fills out weather section based on day's forecast/obs.

e. MC conducts pre-mission brief using the SMEACS format and using the auth brief as notes. If ground support is available, then they should be included. Any issues the crew may have are raised during the brief's Q & A.

f. MC finishes filling out the auth brief with any risk management or safety issues raised, any administration issues or requests (such as accommodation, transport, meals, fuel bookings, etc), ticks the boxes that the crew is fit for duty and that the pre-mission briefing has been completed.

g. The MC sends the electronic form or, if using a hard copy, takes an image of the filled out auth brief, and sends it to the SBFO/SBFC. The SBFO/SBFC will acknowledge receipt of the brief by email, SMS or phone call and can contact the MC if there are any points that need to be raised or clarified.

h. The mission is flown.

i. At the end of the day's flying, a post-mission de-brief is conducted with the crew led by the MC (as soon as possible after flying has ceased) and any issues are raised or clarified. If ground support is available, then they should be included. The MC can then fill out the 'backbrief' field at the base of the page. Information relevant to the day's flying can be placed in there along with the hours flown as provided by the PIC.

j. The MC, if using a hardcopy, takes an image of the auth brief with the completed backbrief fields, and sends it, or the electronic form if using the interactive PDF, to SBFO/SBFC who will acknowledge its receipt.

k. If the backbrief is sensitive, then an email followed by a phone call is appropriate. The MC should not only make a phone call, but should send an email with all the details also and then discuss the situation by phone. The backbrief field should be annotated with 'EMAIL WITH DETAILS TO BE SENT'. In this way, any future review of the backbrief will see that note in the backbrief field without compromising any sensitive matters.

l. The SBFO campaign coordinator/SBFC will note and action any issues and will update the record keeping system/risk register and use the auth brief/back brief for tracking of contract obligations and invoicing.

6.3.6 The importance of backbriefing. A backbrief is a recap of a decision or activity. It is designed to inform and explain events or decisions for those that were not necessarily involved. By providing management with a backbrief on the day's activities it is a form of upwards briefing and helps with the review process of an activity and provides situational awareness. Managers need to account for actions of their subordinate to their managers and a backbrief ensures he or she is fully appraised of how an activity is progressing and is a useful tool for reconciling contract obligations.

Section 6.4: Debriefing, backbriefing, reviewing and recording.

6.4.1 The post-mission de-brief. Even though two people may witness the same event, they both will have different accounts of it and remember it happening in different ways. A post-mission de-brief is a way of verifying an event through differing points of view and to clarify any problems. An issue that is minor to one person can be a major issue to another.

6.4.2 When to de-brief. The de-briefing can occur at any time after the mission, but it is advisable that it be done as soon as possible before memories fade. One recommendation is to do it while still strapped in and on headset while the engine is cooling down prior to it being shutdown. The other alternative is to gather at the aircraft once the rotors have stopped and after everyone has had a chance to have a drink or visit the restroom and then conduct the debrief. The least preferable method is to conduct the de-brief later at dinner or at the accommodation. This is when memories are not so fresh nor is the motivation to sit around and discuss the mission. The earlier it can be done, the faster the day's commitments can be completed and more time available for everyone to relax.

6.4.3 Mission Commander leads the de-brief. The mission commander should lead the conversation and should encourage every team member to speak up and give his or her thoughts on what went right and what went wrong and any problems that may have arisen. The mission commander can do this by:

a. starting with the pre-mission activities such as accommodation, transport, planning and briefing

b. the loading, start, taxi, take-off and climb to transit altitude

c. the arrival at the start point, pre-low flying checks and descent to low level

d. the low level aerial inspection phase and the climb to transit altitude

e. the arrival at the aerodrome circuit area (or any location where the intention is to land), the descent and landing

f. any ground activities such as refuelling, lunch, rest breaks, etc.

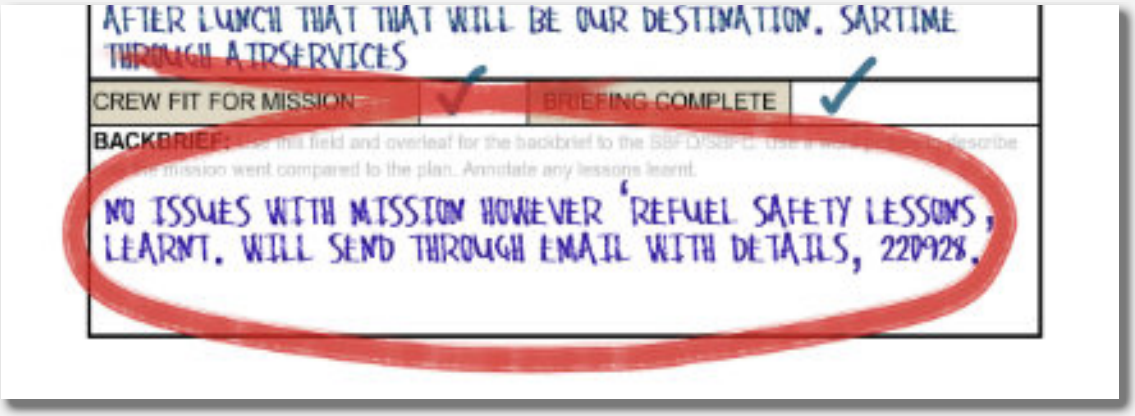
The mission commander will lead the discussion and take notes on anything that is worthy of passing on. The mission commander may wish to discuss sensitive issues in private, such as inter-personal frictions or issues with the aviation contract provider and should deal with them sensitively and in confidence.

The final question the mission commander should ask is: 'Is there anything we could have done better?'

6.4.4 Backbriefing. Once the post-mission de-brief is completed, the mission commander will have a thorough understanding of what happened in the mission from different points of view. He or she should take notes on what was discussed in the team's post-mission de-brief, particularly any issues that may be considered threats or risk controls that were not effective, or even risks that could be considered obsolete. At an appropriate time, the mission commander would then back-brief the SBFO/SBFC and the SBFO/SBFC would determine if the risk register needed to be updated based on the backbrief or if lessons learnt need to be annotated for future use by other teams or by management when conducting a mission, or when organising campaigns in the future, or dealing with the contractor. This is an important function of risk management and a requirement of being compliant with ISO 31000 standards for monitoring and review.

6.4.5 Backbrief as a part of the authorisation brief. For ease of use, the authorisation brief contains a field that can be used for the backbrief. On the front page of the authorisation brief, a field is available for backbrief comments. The mission may have gone exactly as planned, or almost exactly as planned. In that case, there may be no comments needed other than 'nothing significant to report' or 'flights flown in accordance with plan' or something similar. If there were no lessons to be learnt or ways to do things better, then that's fine. Don't waste effort. Submit the backbrief in the same way as the authorisation brief was submitted, electronically, or if using a hardcopy by taking a digital image of the auth brief and the backbrief comments, and then send the image/s to the SBFO/SBFC. He or she will then acknowledge receipt and either follow up with a phone call or a text message.

6.4.6 When there is a significant amount of commentary. In some cases there may be a lengthy backbrief. Avoid the urge to make a phone call to discuss unless it's urgent. Instead, take time to write down the lessons or points, even as dot points, and then forward the backbrief. After the SBFO/SBFC has received it, then discuss it. By doing this there is a guaranteed written copy on file. If only a phone call is made, then the onus is put on the SBFO/SBFC to write down notes which will not be as thorough as notes written by an eyewitness to the lesson to be learnt. TIP: There are plenty of voice to text apps for your phone. Why not dictate your lessons and send them through as an email and then follow up with a phone call. Don't forget to annotate that on the backbrief image you send. Perhaps something like: *'Refuel safety lessons learnt. Will send through email with details, 220928.'*



The backbrief field on the authorisation brief allows for information on the day's flying to be backbriefed to the campaign manager. Backbriefs should be written, either on the auth/backbrief form or by email, then followed up with a discussion, either by phone or face-to-face.

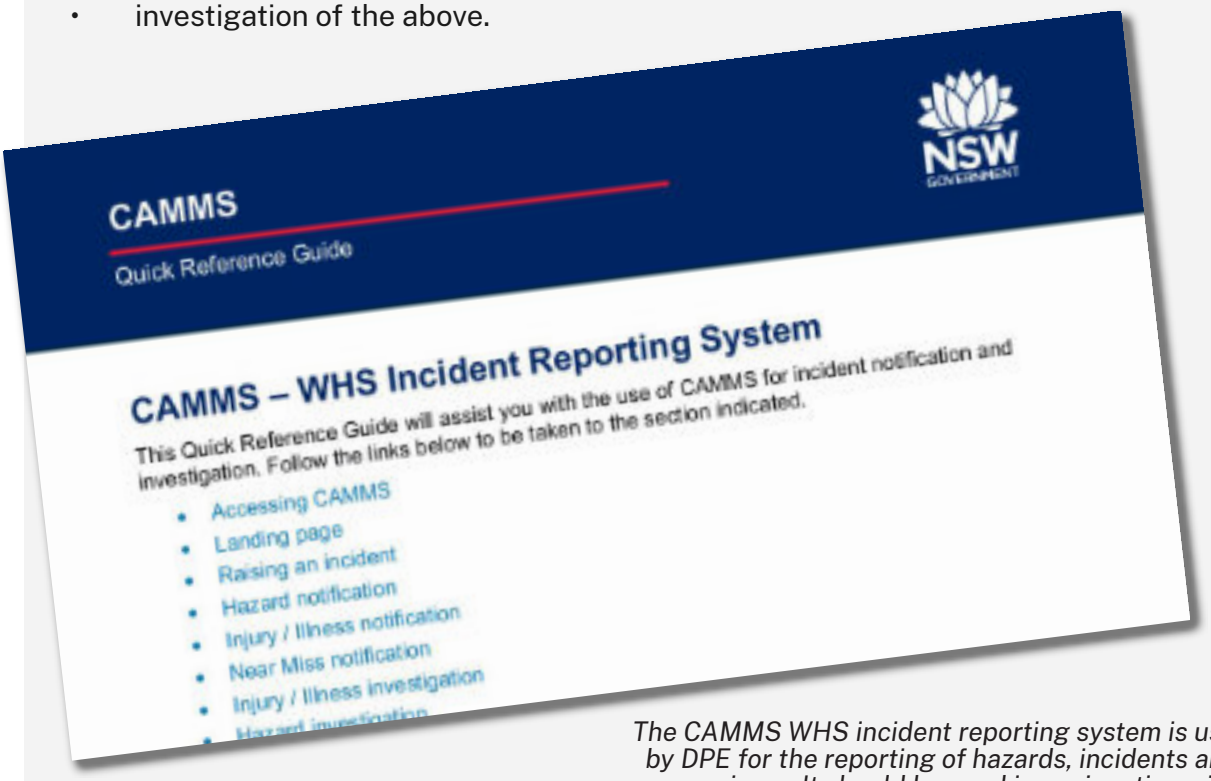
6.4.6 Reviewing. Like communicating, reviewing is a part of the risk management process. If risk management is to be an iterative process and one that is constantly evolving, then review is critical to that process, as is communicating. The campaign manager would look at any issues or trends and determine if things can be done better in the near future or in the next campaign or in the next round of contract negotiations as required.

6.4.6. Recording. If a trend is identified, then that is recorded in an appropriate record of the campaign. If it is a threat that has been identified as a risk, or a risk has been rendered moot, then the risk register should be updated and annotated. This would then be reviewed as part of the ongoing risk review process by management and the risk committee. The risk register can be both a positive and negative risk register, so positive lessons learnt can be recorded therein. Remember! Risk is neither a negative nor a positive occurrence, it's just the chance of something occurring.

Section 6.5: Reporting risks, incidents and accidents

6.4.1 Departmental WHS reporting. The scale of the incident or accident will determine the level of reporting required. Within the DPE the CAMMS reporting system is used for:

- raising an incident
- notifying of a hazard
- notification of an injury or illness
- notification of a near miss
- investigation of the above.



The CAMMS WHS incident reporting system is used by DPE for the reporting of hazards, incidents and near misses. It should be used in conjunction with the procedures outlined in this manual.

CAMMS should be used in conjuction with the specific risk management processes put forward in this manual.

6.4.2 Identifying and reporting a new risk. Any new hazard or threat must be reported in accordance with departmental requirements which will normally be through the CAMMS WHS Incident Reporting System. For threats and hazards relating to the DPE aerial inspection program or flights that result in a new risk being identified, then they also need to be reported to the program coordinator for assessment of risk, assessment of any controls and for input into the risk register for reporting to higher management and as part of the normal risk review process. Make sure that the supervisor chosen in the report is appropriate for the type of hazard. If it is relevant to the aerial inspection, then it should be someone knowledgeable in that area.

6.4.3 Assessing a new risk. The risk assessment process has been described in this manual in Part 4, but in summary it consists of the following steps:

- identify a threat
- put the threat in context
- consider what the consequences may be if the threat is realised
- assess the likelihood and consequences of the threat being realised against known criteria by using the likelihood and consequence tables but with appreciation for any existing controls
- ascertain the inherent risk rating
- consider the hierarchy of controls and put in place any controls that are available to reduce the risk so far as is reasonably practical
- re-evaluate the likelihood and consequences with the new controls in place
- ascertain the new risk rating after the controls have been put in place (ie the residual risk rating)
- brief the management chain
- ensure the risk register is updated

The risk assessment process should not be done in isolation. Anyone with input and knowledge that is available to assist and advise should be involved in the assessment to make it as thorough and as robust as possible.

6.4.4 Monitoring risks. It is the responsibility of the owner of the risk register to ensure the risks are reviewed on a regular basis, however it is every worker's responsibility to raise the issue of any new risks with his/her management and to keep risk owners updated on risks and whether the assessment is still relevant. The backbriefing process is the most regular method of keeping the management chain informed of risks and their relevance to the program. The risk register can thereby be kept relevant.

Reporting an aviation incident or accident.

6.4.5 Regulatory responsibilities. It is a requirement of the Transport Safety Regulations that all notifiable incidents and accidents be reported. If it is an immediately reportable matter, then a 'responsible person' must report it immediately by phone, and then follow up within 72 hours by a written report. If it is a routine reportable matter, then the person must report it by writing within 72 hours.

> **It is every worker's responsibility to raise the issue of any new risks with management**

6.4.6 Who is a responsible person for the purpose of reporting? A responsible person includes a member of the crew, the owner or operator of the aircraft, a member of air traffic control service who is performing a service for the aircraft involved or a member of an aerodrome rescue and firefighting service performing a service for the aircraft concerned, a member of the ground handling crew for the aircraft concerned, a member of CASA or

the operator of the aerodrome.

6.4.7 Who should the report go to? According to the Act, a report, either routine or immediately reportable, must be given to a nominated official who, according to the regulations can be a staff member of the ATSB or the Australian Marine Safety Authority.

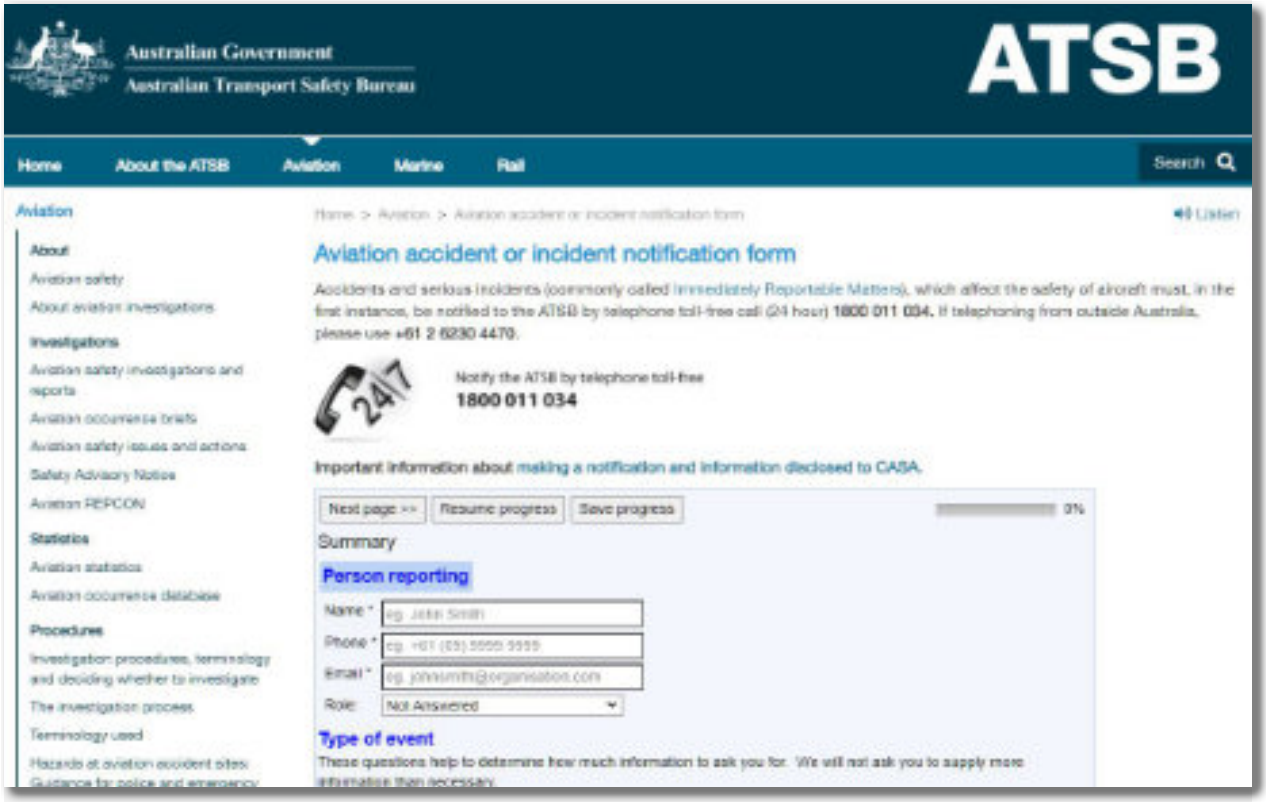
6.4.8 How should an incident or accident be reported? For immediately reportable matters:

'the person must report it to a nominated official as soon as is reasonably practicable by telephone or, if that is not reasonably available, by another form of telecommunication or radio communication.'†

For immediately reportable matters and routine reportable matters, the responsible person can submit the written report using email, electronic form lodgement on the internet or by a data transfer format approved by the ATSB.

6.4.9 Telephone numbers and electronic form for reporting. The ATSB website has an aviation accident or incident notification electronic form for written reports and the telephone numbers for phone reports. At time of writing, the telephone numbers and URL for the electronic form were:

- 1800 011 034 (toll free in Australia)
- +61 2 6230 4470 (from inside or outside Australia)
- www.atsb.gov.au/mandatory/asair-form



The ATSB online Aviation accident or incident notification form. Use this form to make a written report of an immediate or routine notifiable incident. If it is an immediately notifiable incident, the first report should be as soon as possible after the event and done by phone or other telecommunication, followed up by this written form. If the incident is a routinely notifiable incident, then this form is all that is required. (Image from ATSB website)

†. Transport Safety Investigation Regulations 2021, Regulation 40.

6.4.10 What is an immediately reportable matter for aviation operations? An immediate report by phone or other form of telecommunication is required, followed by a report in writing within 72 hours, when one or more of the following events occur:

Immediately reportable matters--aircraft operations generally	
1	The death of, or a serious injury to: (a) a person on board the aircraft or in contact with the aircraft or anything attached to the aircraft or anything that has become detached from the aircraft; or (b) a person who has been directly exposed to jet blast
2	The aircraft being missing
3	The aircraft suffering serious damage, or the existence of reasonable grounds for believing that the aircraft has suffered serious damage
4	The aircraft being inaccessible and the existence of reasonable grounds for believing that the aircraft has been seriously damaged
5	A breakdown of separation standards, being a failure to maintain the separation standard that applies to the aircraft between the aircraft and another aircraft, so long as either or both of the aircraft are being provided with an air traffic separation service Note: A breakdown of separation standards referred to in this item may result from an air traffic service action, a pilot action or other actions.
6	If the aircraft is a type 1 RPA--serious property damage

6.4.11 What is a routinely reportable matter for aviation operations? A report in writing (online form is recommended) is required for all reportable matters within 72 hours. A routinely reportable matter, such as those listed below, need only be reported in writing, not by telephone:

Routinely reportable matters--aircraft operations generally	
1	An injury, other than a serious injury, to a person on board the aircraft
2	A flight crew member becoming incapacitated while operating the aircraft
3	Airprox
4	An occurrence in which flight into terrain is narrowly avoided
5	The use of any procedure for overcoming an emergency
6	An occurrence that results in difficulty controlling the aircraft, including any of the following occurrences: (a) an aircraft system failure; (b) a weather phenomenon; (c) operation outside the aircraft's approved flight envelope
7	Fuel exhaustion
8	The aircraft's supply of useable fuel becoming so low (whether or not as a result of fuel starvation) that the safety of the aircraft is compromised
9	A collision with an animal, including a bird, on a certified aerodrome (within the meaning of the *Civil Aviation Safety Regulations 1998*)


AUSTRALIA
Australian Government
Australian Transport Safety Bureau

Crown Lands Risk Management

Risk management proformas

The proformas below show the key risk management tools used by management and operators in applying the risk management process to the Crown Lands aerial inspection campaign and its constituent flights.

1

Likelihood Table of an event occurring during the DPE Aerial Survey Program	
	These dimensions need to be applied in context and are guides only
5 Almost Certain	• Greater than 90% chance of occurring • "Happens often" • Could occur within "days or weeks"
4 Likely	• Greater than 50% chance of occurring • "Could easily happen" • Could occur within "weeks to months
3 Possible	• Greater than 10% chance of occurring. • "Could happen", "Has occurred before" • Could occur within "the next 12 months"
2 Unlikely	• Greater than 1% chance of occurring • "Hasn't happened yet, but could" • Could occur sometime within "the next few years"
1 Rare	• Less than 1% chance of occurring • "Conceivable, but only in extreme circumstances", • "Exceptionally unlikely, even in the longer term". • A"once in a hundred years" event

Likelihood table - when a threat is identified its likelihood is estimated using this table

Consequence matrix - when a threat is identified its consequences are estimated using this table

2

Negative Consequence Table for an incident involving DPE Aerial Survey Program				
	Health and Safety Impact	Capability Impact (pers or eqpt)	Financial and Reputational Impact	Legal/Regulatory Impact
5 Extreme	Multiple fatalities and/or critical injuries with significant hospital attention required.	Loss of key service delivery requiring replacement or external assistance for extended period.	Financial loss of up to $10 million (or possibly more). Significant reputational damage to Govt.	Public scrutiny. Prosecutions, fines or class action. Legal action against responsible officers.
4 Major	Single fatality and/or serious injuries with significant hospital attention required.	Loss of key service delivery requiring replacement or external assistance for short period (eg 1 week).	Financial loss of up to $1 million. DPE reputation damaged.	Public scrutiny. Prosecutions by regulator or fines. Investigation into role of responsible officers.
3 Moderate	Work limiting injuries with medical attention required.	Delay to service delivery for short period (eg 1 day).	Financial loss of up to $100,000. DPE reputation suffers.	Investigation by regulator. Possible punitive action. Recommendations. Audit.
2 Minor	Minor injuries with some minor attention required.	Disruption to service delivery.	Financial loss of up to $10,000. DPE reputation on internal audience tarnished.	Investigation by the department using internal processes.
1 Insignificant	Near miss.	Delay to service delivery to reassess the operation being undertaken.	Financial loss of up to $1,000. Little to no effect on DPE reputation.	Checks made by operators to ensure current risk management is adequate.

3

Risk Rating Table (Likelihood vs Consequence) for DPE Aerial Survey Program					
		Consequence			
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Extreme
Likelihood	5 Almost Certain	Low (L7)	Medium (M4)	High (H4)	Critical (C4)	Critical (C1)
	4 Likely	Low (L8)	Medium (M5)	High (H5)	High (H2)	Critical (C2)
	3 Possible	Low (L9)	Low (L4)	Medium (M3)	High (H3)	Critical (C3)
	2 Unlikely	Low (L10)	Low (L5)	Low (L2)	Medium (M2)	High (H1)
	1 Rare	Low (L11)	Low (L6	Low (L3)	Low (L1)	Medium (M1)

Risk rating matrix - the likelihood and consequences of a threat are used to establish a risk rating

Risk evaluation table - the risk rating of the threat is its inherent risk rating. After controls are put in place a new 'residual' risk rating is established. This table is similar to the risk register.

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparatin (c ont.) This set of risk evaluations concerns those threats and likelihoods that may occur during the contractual arrangements and other preparatins f or an aerial inspection campaign.								
Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.4	Successful contractor is unable to service the contract with the appropriate manning / equipment in accordance with the program leading to inefficiencies in flight operations	3 Possible	3 Moderate	M3 Medium	- Contract is specific in its requirements for manning / equipment to be employed and involved in campaign planning. Potential issues are identifie in advanced and program adjustments made in order to achieve the required end state without loss to DPE.	2 Unlikely	3 Moderate	L2 Low
0.5	Personnel involved with the DPE aerial inspection program are not familiar with NSW Aviation SOPs leading to inefficiencies or safety violations	4 Likely	3 Moderate	H5 High	All DPE personnel engaged in aviation operations are given access to NSW Aviation SOPs. DPE Personnel are provided the opportunity for relevant safety training that includes NSW Government SOPs and their use.	2 Unlikely	3 Moderate	L2 Low
0.6	Personnel involved with the DPE aerial inspection program are not adequately trained leading to inefficiencies or significant safety infringements.	4 Likely	3 Moderate	H5 High	Personnel involved with the DPE aerial inspection program are provided DPE approved training relevant to the task which may include subjects such as mission command, Team Resource Management, Working Safely Around Aircraft, Low Level Flying Hazards, Human Factors.	2 Unlikely	3 Moderate	L2 Low

Risk escalation table - this table provides information on when a risk needs to be escalated higher and who the approving authority is.

Risk escalation and action for DPE Crown Landsaerial in spection program If, upon applying thenrelevant controls to an inherent risk (if possible), there sidual risk rating will require risk acceptance by the responsible approval authorityandtice tad bel ow.			
Risk Rating	Escalation and Reporting to	Response or Action	Approval Authority
CRITICAL	Report immediately to theAppr oving Authorityprior t o theac tivity commencing and then ongoing reporting as directed by theAppr oving Authority. Chief Exec/ARC: Quarterly, if therisk is ongoing	Immediate action isrequ ired to eliminate the risk or reduce itslikelihood/c onsequences. Refer to theher archy of controls (Section 5.2). Activities that expose workers to thislevel of risk require approval by theAppr oving Authority for critical risks.	Executive Director
HIGH	Report immediately to theAppr oving Authorityprior t o theac tivity commencing and then ongoing reporting as directed by theAppr oving Authority. Chief Exec/ARC: Quarterly, if therisk is ongoing	Immediate action isrequ ired to eliminate the risk SFAIRP or reduce itslikelihood / consequences.Refer t o theher archy of controls (Section 5.2). Activities that expose workers to thislevel of risk require approval by theAppr oving Authority for risks rated as high.	Program Manager (Normally SBFO)
MEDIUM	Report immediately to theAppr oving Authorityprior t o theac tivity commencing and then ongoing reporting as directed by theAppr oving Authority. Chief Exec/ARC: Bi-annually and during routine risk reviews and audits	Immediate action isrequ ired to eliminate the risk SFAIRP or reduce itslikelihood / consequences.Refer t o theher archy of controls (Section 5.2). Activities that expose workers to thislevel of risk require approval by theAppr oving Authority for risks rated as medium.	Program Coordinator (Normally the Responsible SBFO)
LOW	Report to theAppr oving Authority routinely (eg during backbriefs) to confirm risk levels remain as assessed,or as directed by theAppr oving Authority. Chief Exec/ARC: Annually and during routine risk reviews and audits	All workers are to ensurethe t likelihood, consequences and risk levels remain as assessed through thecontant use of controls. Any deviations require a new risk assessment.	Mission Crew (reporting to Program Coordinator)

Risk escalation table - this table provides information on when a risk needs to be escalated higher and who the approving authority is.

SMEACS Mission Planning tool and Brief - the SMEACS format can be used to plan a mission, to ensure risks and safety are taken into account and that all appropriate measures have been undertaken for a safe and efficient mission.

CROWN LANDS AERIAL INSPECTION FLIGHT SMEACS BRIEF Use this SMEACS format to plan a mission and conduct the mission brief	
1	**SITUATION AND PRELIM INFO (confirm with PIC prior to crew brief)**
	Topography - Area/trails to be worked/transited identified (use map/mud map if poss)
	Key hazards known - Powerlines, terrain, airspace, sensitive areas
	Other assets - Support pers, landing sites, emergency services
	Meteorology - Forecasts, observations, sun and wind direction, rain, likely obscurations
	Notifications - Landowners, SAR/Flight following, flight auth, PR plan, public notices
2	**MISSION - Astatement of the aim and outcome (State Who, What, When, Why)**
3	**EXECUTION - An outline of how the mission will be run**
	Timings - Travel to airfield, start/take off, endurance, refuels, breaks, on station,
	off station, expected end of mission and destination, 8 flt hrs maximum
	Tracks / Altitudes - Use map/mud map if poss to describe tracks to be flown
	Crew tasks - Pilot, MC, AOBs, Grnd supt, others
	Scan & duties - Visual arcs of responsibility, traffic/obstacles, nav, radios, other duty
	Any special consids - Acft performance, cargo, landing sites/airfields, pax, tasks
	Cargo and CG - Cargo weighed. Pilot informed of cargo. Pilot confirms CG
3b	**Contingencies - Actions on expected or unexpected events**
	Emergencies - forced landing SOPs, warning lights, use of checklists, ICS failures
	Weather - Bad WX in flight. Bad WX after landing (PIC to provide advice)
	Risk Mngt - All likely risks ID'd, controls instigated. New risks reported with flight auth
4	**ADMINISTRATION AND LOGISTICS**
	Mission Eqpt - Checked/ready/secured/accessible/spare power
	Personal & Survival Eqpt - PLBs, water, food checked, secured
	Accom & Transport - Coordinated
	Dangerous Goods - Pilot notified, DG prepared, paperwork done, loaded or carried
	Fuel/Oil - Refuellers notified, locations and timings coordinated
	Rations - B'fast-lunch-dinner / dring breaks, locations, timings
	Briefings - All briefs completed, pax briefs confirmed, special briefs done
	Personnel - Qualified, current, no physical/psych issues, IMSAFE checks
5	**COMMAND AND COMMUNICATIONS**
	Mission Command - Describe duties and authority
	Aircraft (PIC) Command - Describe duties and authority
	Company/Org - Requirements of the task. POC details.
	Comms - Freqs ID'd/checked, eqpt checked/ready, back ups, phone nos for ea pers.
6	**SAFETY, QUESTIONS, ADDITIONALPOINTS**
	Risks and Safety - Any concerns? Any final questions?
	Duty times confirmed - 10 hr duty day max / 12 hrs with auth / 8 hrs flying max
	Debrief - Location and time, backbrief to coordinator after crew debrief, check flt hrs
	Pilot Brief - Hand over to pilot for his/her brief if necessary/reqd.
	Complete Flight Auth details to submit to campaign coordinator
	Pre-flight inspection, fuel check, final walkaround - for flight crew
	HLS Security - ID likely hazards, caution onlookers, assign security if reqd

Flight Authorisation Form - this form assists with the mission brief and is a means of keeping the campaign coordinator informed of the intent of a mission and any safety or risk issues he or she needs to be aware of. It's also a tool for communicating and reviewing safety/risk issues.

CROWN LANDS AERIAL INSPECTION FLIGHT AUTHORISATION FORM Complete as much of thisform a s possible prior to crew brief. After crew brief, complete thisform and send an image of it or as an electronic copy to the camp aign coordinator. If it isen t electronically, ensureit is sa ved as "YYMMDD_flight_auth_brief" prior to sending.			
Mission No or Area to be worked		Date (YYMMDD	
Mission Comd and ph no		PIC and ph no	
AOB 1 and ph no		AOB 2 and ph no	
Other crew and ph no		Gnd Spt and ph no	
Departure Pt and ETD		Likely Destination and ETA	
Trailsto be inspec ted			
Anticipated Landing sites			
Weather			
AnyRisk Mng t or Safety Issues			
AnyAdmin Is suesor reque sts			
Isthe crew fit for themis sion?		Areal l briefings complete?	Will a dutyday extension be requested?
Backbrief information			

Part 7: Templates and Proformas
Section 7.1: Overview

7.1.1 Templates and proformas. The templates and proformas in this section are those required to be able to undertake a person's responsibilities in indentifying and controlling threats, their likelihood and exposure.

7.1.2 Table no 1: the risk likelihood table. The risk likelihood table (Table no 1) looks at quantifying the likelihood of an event occurring in the context of DPE Crown Lands aerial inspection programs. Any new risk should be quantified using this table by persons who are experienced and knowledgeable about Crown Lands operations and the threat being considered.

7.1.3 Matrices no 2: Negative and positive consequences matrix. The consequences matrices look at what may happen if an event, either positive or negative, occurs. When looking at a threat, use the negative consequence table. When looking at an opportunity, use the positive consequence table.

7.1.4 Matrix no 3: The risk rating matrix. Once the likelihood and consequence of a threat or opportunity have been quantified, use the scores to in the risk rating matrix to determine the risk level. This will determine at what level the risk lies and who the risk owner is that is responsible for the risk being accepted or rejected.

7.1.5 Risk evaluation tables. The risk evalution tables looks at all possible risks during all the phases of a campaign plan and a mission and quantifies them using the tables and matrices described above. Controls are put in place to determine their residual risk.

7.1.6 Risk escalation and action table. The risk escalation table outlines who is responsible for the level of risk identified in the risk rating matrix. Most risks associated with the aerial inspection campaign can be accepted by the mission crew based on a risk rating of 'low'.

7.1.7 Risk register (held by SBFC and SBFO). The risk register is an extension of the risk evaluation tables but allow for comment and review. The risk register will be reviewed on a regular basis to ensure that all risks are still relevant and that any new risks are considered and included. If the risk register is updated then the corresponding risk evaluation table should also be updated in order to allow all members to see the risk evaluations for a given risk.

7.1.8 SMEACS mission brief. The SMEACS briefing proforma covers all the key elements of a mission that need to be coordinated and briefed to ensure that all members of the crew understand what is required of them to achieve a succesful missoin outcome. SMEACS is derived from the military five-paragraph briefing format and can also be used as a planning tool. The name comes from the initials of the areas to be covered in the brief, namely: Situation, Mission, Execution, Administration / Logistics, Command / Signals, and Safety.

7.1.9 Flight authorisation form. As described earlier, the flight authorisation form is a means of briefing and back-briefing the campaign coordinator before and after flights. It also aids if conducting the mission brief.

1	Risk likelihood table for an incident involving DPE Aerial Inspection Program
5 Extreme	• Greater than 90% chance of occurring • “Happens often” or “Usually happens” • Could occur “this time or next”
4 Major	• Greater than 50% chance of occurring • “Could easily happen this time” • Could occur within “days to weeks”
3 Moderate	• Greater than 10% chance of occurring • “Could conceivably happen” or “Has occurred before” • Could occur within “the next 12 months”
2 Minor	• Greater than 1% chance of occurring • “Hasn’t happened but possibly could” • Could occur sometime within “the next few years”
1 Insignificant	• Less than 1% chance occurring • “Conceivable, but only in extreme circumstances” or “Exceptionally unlikely, even in the longer term” • A “Once in a hundred years” event

The risk likelihood table (Table 1) is used to help quantify a threat and the likelihood it will be realised. When a threat and its likelihood have been quantified using this table, the rating can be used in the risk evaluation (Matrix 3)

2	Negative Consequence table for an incident involving DPE Aerial Inspection Program			
	Health and Safety Impact	**Capability Impact (Pers or eqpt)**	**Financial and Reputational Impact**	**Legal/Regulatory Impact**
5 Extreme	Multiple fatalities and/or critical injuries with significant hospital attention required.	Loss of key service delivery requiring replacement or external assistance for extended period.	Financial loss of up to $10million (or poss more). Significant reputational damage to Govt	Public scrutiny. Prosecutions, fines or class action. Legal action against responsible officers
4 Major	Single fatality and/or serious injuries with significant hospital attention required.	Loss of key service delivery requiring replacement or external assistance for a short period. (eg 1 week)	Financial loss of up to $1 million (or poss more). DPE reputation damaged.	Public scrutiny. Prosecutions by regulator or fines. Investigation into role of responsible officers.
3 Moderate	Work limiting injuries with medical attention required.	Delay to service delivery for short period (eg 1 day)	Financial loss of up to $100,000.00. DPE reputation suffers.	Investigation by regulator. Possible punitive action. Recommendations. Audit.
2 Minor	Minor injuries with some minor attention required.	Disruption to service delivery.	Financial loss of up to $10,000.00. DPE reputation on its internal audience tarnished.	Investigation by the department using internal processes.
1 Insignificant	Near miss.	Delay to service delivery to re-assess the operation being undertaken.	Financial loss of up to $1000.00. Little to no effect on DPE reputation.	Checks made by operators to ensure current risk management is adequate.

The negative consequence matrix (Matrix 2) is used to help quantify a threat and the impact it will have if it is realised. When a threat and its consequence/s have been quantified using this table, the rating can be used in the risk evaluation (Matrix 3)

2	Positive Consequence table for an incident involving DPE Aerial Inspection Program			
	Program effectiveness	**State and DPE Capability Impact**	**State and DPE Financial Impact**	**DPE (CL) Reputational Impact**
5 Extreme	Completely successful. 100% of CL fire trails inspected. 100% of data gathered. Trails in other jurisdictions also inspected. No safety issues.	All NSW fire trails successfully inspected. All information provided to all relevant stakeholders for FAFT plans. All DPE CL and other agency pers benefit from OJE.	NSW: Significant gains almost assured by ensuring all fire trails are remediated through CL data. DPE: Contract value for money exceeds expectations.	DPE reputation enhanced significantly at ministerial level. Public aware of positive CL activities. Other Depts see CL as reliable and capable.
4 Major	Completely successful. 100% of CL fire trails inspected. 100% of data gathered. No safety issues.	All NSW CL fire trails successfully inspected. All information provided to CL for FAFT plans. All DPE CL and other agency pers benefit from OJE.	NSW: Signifcant gains made probable by ensuring fire trails are fit for purpose. DPE: Contract value as forecast. Contingency costs: nil	DPE reputation enhanced significantly within NSW Govt. Public aware of positive CL activities. Other Depts see CL as reliable and capable.
3 Moderate	Mostly successful. >90% of CL fire trails inspected. >90% of data gathered. No significant safety issues.	Most NSW CL fire trails successfully inspected. Data provided for trail remediation. Most DPE CL personnel benefit from OJE.	NSW: Financial gains in most areas probable by ensuring fire trails are fit for purpose. DPE: Contract value hampered by use of some contingency funds.	CL reputation enhanced significantly within DPE. Other depts happy to work with CL to achieve mutual aims.
2 Minor	Somewhat successful. >80% of CL fire trails inspected. >80% of data gathered. No major safety issues.	A significant number of NSW CL fire trails successfully inspected. Some ground inspections reqd. Several CL personnel benefit from OJE.	NSW: Financial gains in most areas assisted by ensuring fire trails are fit for purpose. DPE: Contract uses some contingency funds.	CL reputation enhanced withing its own division as a 'Can Do' organisation.
1 Insignificant	For the most part - successful. >70% of CL fire trails inspected. >70% of data gathered. No critical safety issues.	A large portion of NSW CL fire trails inspected. Many ground inspections still required. Some DPE CL personnel benefit from OJE.	NSW: Financial gains in many areas assisted by ensuring fire trails are fit for purpose. DPE: Contract value hampered by cost overruns.	No significant change to reputation.

The positive consequence matrix (Matrix 2) is used to help quantify a threat and the impact it will have if it is realised. When a threat and its consequence/s have been quantified using this table, the rating can be used in the risk evaluation (Matrix 3)

3

Risk Rating Matrix

Likelihood Rating	Consequence Rating: 1 Insignificant	2 Minor	3 Moderate	4 Major	5 Extreme
5 Almost Certain	Low (L7)	Medium (M4)	High (H4)	Critical (C4)	Critical (C1)
4 Likely	Low (L8)	Medium (M5)	High (H5)	High (H2)	Critical (C2)
3 Possible	Low (L9)	Low (l4)	Medium (M3)	High (H3)	Critical (C3)
2 Unlikely	Low (L10)	Low (L5)	Low (L2)	Medium (M2)	High (H1)
1 Rare	Low (L11)	Low (L6)	Low (L3)	Low (L1)	Medium (M1)

The risk rating matrix (Matrix 3) is used to determine a risk rating based on the likelihood and consequences of a risk being realised.

Risk escalation and action for DPE Crown Lands aerial inspection program If, upon applying the relevant controls to an inherent risk (if possible), the residual risk rating will require risk acceptance by the responsible approval authority as indicated below.			
Risk Rating	**Escalation and Reporting to**	**Response or Action**	**Approval Authority**
CRITICAL	Report immediately to the Approving Authority prior to the activity commencing and then ongoing reporting as directed by the Approving Authority. Chief Exec/ARC: Quarterly, if the risk is ongoing	Immediate action is required to eliminate the risk or reduce its likelihood/consequences. Refer to the hierarchy of controls (Section 5.2). Activities that expose workers to this level of risk require approval by the Approving Authority for critical risks.	Executive Director
HIGH	Report immediately to the Approving Authority prior to the activity commencing and then ongoing reporting as directed by the Approving Authority. Chief Exec/ARC: Quarterly, if the risk is ongoing	Immediate action is required to eliminate the risk SFARP or reduce its likelihood /consequences. Refer to the hierarchy of controls (Section 5.2). Activities that expose workers to this level of risk require approval by the Approving Authority for risks rated as high.	Program Manager (Normally SBFC)
MEDIUM	Report immediately to the Approving Authority prior to the activity commencing and then ongoing reporting as directed by the Approving Authority. Chief Exec/ARC: Bi-annually and during routine risk reviews and audits	Immediate action is required to eliminate the risk SFARP or reduce its likelihood /consequences. Refer to the hierarchy of controls (Section 5.2). Activities that expose workers to this level of risk require approval by the Approving Authority for risks rated as medium.	Program Coordinator (Normally the Responsible SBFO)
LOW	Report to the Approving Authority routinely (eg during backbriefs) to confirm risk levels remain as assessed, or as directed by the Approving Authority. Chief Exec/ARC: Annually and during routine risk reviews and audits	All workers are to ensure that likelihood, consequences and risk levels remain as assessed through the constant use of controls. Any deviations require a new risk assessment.	Mission Crew (reporting to Program Coordinator)

The risk escalation matrix is used to describe the action required when a particular risk rating is encountered and who can accept it at that level.

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparation

This set of risk evaluations concerns those threats and likelihoods that may occur during the contractual arrangements and other preparations for an aerial inspection campaign.

ENVIRONMENT: Office (ie not field) environment requiring cooperative efforts between individuals, teams, agencies, departments and external service providers.

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.1	Contracted organisation is unable to provide adequate personnel or equipment to service the contract in accordance with task needs, NSW Aviation SOPs or other mandated minimum standards.	3 Possible	4 Major	**H3 High**	Contractor is vetted and audited as suitable (eg by State Air Desk or other appropriate authority) and has been approved by the DPE as having the minimum required personnel and equipment for the relevant task. Contract requires submission of relevant evidence for review by DPE including contractor's internal minimum safety standards for its personnel.	2 Unlikely	4 Major	**M2 Medium**
0.2	Contractor's personnel do not possess the appropriate licencing / endorsements / qualifications	3 Possible	4 Major	**H3 High**	Contractor is vetted and audited as suitable (eg by State Air Desk or other appropriate authority) and has been approved by the DPE as having the minimum required qualified personnel for the relevant task. Contract requires submission of relevant evidence for review by DPE.	2 Unlikely	4 Major	**M2 Medium**
0.3	Contractor does not have in place an adequate Safety Management System and Fatigue Management System (if not using CAO 48) and other systems deemed as the minimum standard for an aviation contractor as per SAD requirements and audits leading to an inappropriate choice in contractor	3 Possible	4 Major	**H3 High**	Contractor is vetted and audited as suitable (eg by State Air Desk or other appropriate authority) and has been approved by the DPE as having the minimum required safety systems in place and an appropriate safety record as per minimum government standards for aviation contractor organisations. Contract requires submission of relevant evidence for review by DPE.	2 Unlikely	4 Major	**M2 Medium**

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparation (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the contractual arrangements and other preparations for an aerial inspection campaign.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.4	Successful contractor is unable to service the contract with the appropriate manning / equipment in accordance with the program leading to rushed or cancelled flight operations	3 Possible	3 Moderate	**M3 Medium**	Contract is specific in its requirements for provision of services. Contractor is engaged and involved in campaign planning. Potential issues are identifie in advanced and program adjustments made in order to achieve the required end state without loss to DPE.	2 Unlikely	3 Moderate	**L2 Low**
0.5	Personnel involved with the DPE aerial inspection program are not familiar with NSW Aviation SOPs leading to inefficiencies or safety violations	4 Likely	3 Moderate	**H5 High**	All DPE personnel engaged in aviation operations are given access to NSW Aviation SOPs. DPE Personnel are provided the opportunity for relevant safety training that includes NSW Government SOPs and their use.	2 Unlikely	3 Moderate	**L2 Low**
0.6	Personnel involved with the DPE aerial inspection program are not adequately trained leading to inefficiencies or significant safety infringements.	4 Likely	3 Moderate	**H5 High**	Personnel involved with the DPE aerial inspection program are provided DPE approved training appropriate to their task which may include subjects such as mission command, Team Resource Management, Working Safely Around Aircraft, Low Level Flying Hazards, Human Factors.	2 Unlikely	3 Moderate	**L2 Low**

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparation (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the contractual arrangements and other preparations for an aerial inspection campaign.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.7	The number of DPE Crown Lands personnel who are physically and psychologically able to be trained are not sufficient, or, for the purpose of the campaign, there are not enough personnel available for all flights due to shortages or absences.	2 Unlikely	3 Moderate	L2 Low	Sufficient personnel are located and trained from various regions in the state. Management personnel remain current and recent to be able to backfill. Other agencies with the same skills can be called upon to fill crew positions on an ad hoc basis.	1 Rare	3 Moderate	L3 Low
0.8	The aerial inspection program generates interest from external stakeholders leading to requests for DPE to undertake further tasks which impacts on the aerial inspection program (aka mission creep constraints), or causes additional complexity (eg administrative restraints such as approvals, accommodation, travel arrangements, etc)	4 Likely	3 Moderate	H5 High	aerial inspection program plans for foreseeable constraints (eg PR) by integrating those activities into the program after ensuring it is resourced. Other non-essential requests are vetted and if deemed necessary, are planned for and resourced where possible or reported on where not to ensure financial transparency of costs associated with the program. Unnecessary or unresourced task requests are rejected with an explanation to the stakeholder. Stakeholder points of contact are identified early and specific SMART goals are given to those POCs to meet in a timely manner if the stakeholder wishes to utilise planned DPE resources.	3 Possible	3 Moderate	M3 Medium
0.9	Personnel involved with the DPE aerial inspection program are not adequately trained leading to inefficiencies or significant safety infringements.	4 Likely	3 Moderate	H5 High	Personnel involved with the DPE aerial inspection program are provided DPE approved training appropriate to their task which may include subjects such as mission command, Team Resource Management, Working Safely Around Aircraft, Low Level Flying Hazards, Human Factors.	2 Unlikely	3 Moderate	L2 Low

Phase 0 Risk Evaluation - Aerial Campaign Planning and Preparation (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the contractual arrangements and other preparations for an aerial inspection campaign.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
0.10	Personnel from external agencies that request to be included do not value add to the mission due to inexperience, level of training, or other priorities not related to the aerial inspection.	4 Likely	3 Moderate	**H5 High**	Personnel involved with the DPE aerial inspection program are briefed on their responsibilities and the expectations by the program manager and/or mission commander.	2 Unlikely	3 Moderate	**L2 Low**
0.11	Personnel from external agencies that request to be included do not value add to the mission due to inexperience, level of training, or other priorities not related to the aerial inspection.	4 Likely	3 Moderate	**H5 High**	Personnel involved with the DPE aerial inspection program are briefed on their responsibilities and the expectations by the program manager and/or mission commander.	2 Unlikely	3 Moderate	**L2 Low**
0.12	Approval for non-critical passengers requires significant administration leading to delays and other burdens.	4 Likely	2 Minor	**M5 Medium**	Likely non-critical passengers are identified as part of the pre-campaign planning and permission sought ahead of time; authority for passengers abord specific flights delegated to campaign planners (eg State Bush Fire Coordinator / Regional Bush Fire Coordinator) as part of the DPE's aerial inspection campaign approval process	3 Possible	2 Minor	**L5 Low**

Phase 1 Risk Evaluation - Pre-Mission Activities

This set of risk evaluations concerns those threats and likelihoods that may occur while the crew is preparing for missions, resting, eating, drinking or other non-work related activities that may have an impact on missions.

Environment will normally be reporting for work and/or external accommodation (eg home, travelling, hotels, etc)

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
1.1	Fit for duty. Physiological. Crew member/s suffering from illness or other ailments that may cause reduced capability or incapacitation during the mission leading to mission ineffectivness.	3 Possible	3 Moderate	**M3 Medium**	Mission Crew are trained in concepts of TRM including: effects of illness and other stressors; the 'no fault' request for omission from duty due to physiological / psychological stressors. Mission Crew conduct pre-mission briefs including fitness for flight confirmation. Contracted crew adheres to company ops manual requirements and relevant CASRs. Contracted Crew confirm status as part of pre-mission brief.	2 Unlikely	3 Moderate	**L2 Low**
1.2	Fit for duty. Psychological. Crew member/s suffering from psychological stresses that may cause reduced capability or incapacitation during the mission leading to mission ineffectivness.	3 Possible	3 Moderate	**M3 Medium**	Mission Crew are trained in concepts of TRM including: effects of illness and other stressors; the 'no fault' request for omission from duty due to physiological / psychological stressors. Mission Crew conduct pre-mission briefs including fitness for flight confirmation. Contracted crew adheres to company ops manual requirements and relevant CASRs. Contracted Crew confirm status as part of pre-mission brief.	2 Unlikely	3 Moderate	**L2 Low**

Phase 1 Risk Evaluation - Pre-Mission Activities (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur while the crew is preparing for missions, resting, eating, drinking or other non-work related activities that may have an impact on missions.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
1.3	Fit for duty. Toxicants. Crew member/s suffering the effects of intoxicants (alcohol/legal or illegal drugs, etc) reduces crew's overall effectiveness and can lead to mission degradation	3 Possible	3 Moderate	**M3 Medium**	Mission Crew are trained in concepts of TRM including: effects of alcohol and prescription/non prescription drugs on the human body. Mission Crew conduct pre-mission briefs including fitness for flight confirmation. Contracted organisation has its own Drug and Alcohol Management Plan (DAMP) endorsed by CASA. Spot checks may be carried out as per CASRs.	2 Unlikely	3 Moderate	**L2 Low**
1.4	Fit for duty. Fatigue. Crew member/s suffering from fatigue prior to reporting for work due to actions within or outside the crew member's control reduces crew's overall effectiveness and can lead to mission degradation	3 Possible	3 Moderate	**M3 Medium**	Mission Crew are trained in concepts of TRM including: effects of fatigue on mission effectivess. Mission Crew conduct pre-mission briefs including fitness for flight confirmation. Contracted organisation has its own fatigue management plan endorsed by CASA.	2 Unlikely	3 Moderate	**L2 Low**

Phase 2 Risk Evaluation - Pre-flight planning, briefing / de-briefing

This set of risk evaluations concerns those threats and likelihoods that may occur during the planning of a mission and the pre-mission briefing and the post-flight de-briefing

Environment will normally be within the accommodation or at an airfield or similar place where pre-mission information can be obtained and can be used for planning and then the conduct of the pre-mission brief, and later, the post-mission debrief.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
2.1	Mission Commander does not assume an appropriately authoritative role leading to ambiguity in who is in charge of the mission or deficiencies in the coordination of the mission.	4 LIkely	2 Minor	**M5 Medium**	All mission crew trained in mission command responsibilities. Mission Commanders encouraged to be assertive in their roles and to take responsibility for outcomes. Mission Commander reponsible for pre-mission briefings which includes briefing the status of command for the mission.	2 Unlikely	2 Minor	**L5 Low**
2.2	Mission aims not articulated satisfactorily by the department leading to ambiguity that impacts on mission success. This may include tasks that are not directly associated with aerial inspection of fire trails.	2 Unlikely	3 Moderate	**L2 Low**	Mission commander ensures that the mission's aims are included in the pre-flight brief and that they are briefed to the entire crew.	1 Rare	3 Moderate	**L3 Low**

Phase 2 Risk Evaluation - Pre-flight planning, briefing / de-briefing (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the planning of a mission and the pre-mission briefing and the post-flight de-briefing

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
2.3	PIC does not access relevant NOTAMS, weather or other mandated pre-flight information leading to mission being terminated due to unforeseen events such as lack of fuel and possible violation of CASRs	2 Unlikely	3 Moderate	**L2 Low**	Mission Commander ensures PIC is ready for his/her part of the pre-mission brief which includes briefing the entire crew on NOTAMS, fuel requirements, refuelling locations and other mission relevant information.	1 Rare	3 Moderate	**L3 Low**
2.4	PIC does not conduct correct performance planning leading to mission delays or mission failures, or PIC does not inform mission crew of performance limitations leading to mission delays or mission failures.	3 Possible	3 Moderate	**M3 Medium**	Mission Commander works with PIC to ensure time and resources are available for correct performance planning. Mission Commander gives pre-mission brief including requirement for PIC to provide details on expected aircraft performance based on prevailing conditions.	2 Unlikely	3 Moderate	**L2 Low**
2.5	Relevant maps, charts, documents or other references not referred to leading to no risk assessment being carried out or an inadequate risk assessment being carried out for the mission leading to threats and hazards not being identified nor controlled which impacts on mission success.	3 Possible	3 Moderate	**M3 Medium**	Mission Commander conducts pre-mission brief which includes information about those risks identified and which controls have been put in place.	2 Unlikely	3 Moderate	**L2 Low**

Phase 2 Risk Evaluation - Pre-flight planning, briefing / de-briefing (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the planning of a mission and the pre-mission briefing and the post-flight de-briefing

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Like-lihood	Con-sequence	Residual Risk Rating
2.6	Likely landing sites, aerodromes, refuelling sites are not adequately planned or assessed or secured or briefed or permissions left unconfirmed leading to miscoordination, safety incursions by persons or animals, or mistakes which impact on mission success.	2 Unlikely	3 Moderate	**L2 Low**	Mission Commander ensures PIC is ready for his/her part of the pre-mission brief which includes briefing the entire crew on flight routes, landing sites, refuelling sites and other mission relevant information. All members of the crew are reminded of their duties to ensure safety in and around aircraft, especially at landing sites where unknown hazards exist.	1 Rare	3 Moderate	**L3 Low**
2.7	Flight notifications (for SAR and for landowners / stakeholders)not submitted as per SOPs, pre-arranged agreements and/or operations manual leading to ambiguity in the mission tracking and possible violation of procedures and damaging the reputation of Crown Lands. Possible SAR action may be delayed in the event of an incident/accident.	3 Possible	3 Moderate	**M3 Medium**	Mission Commander ensures PIC is ready for his/her part of the pre-mission brief which includes ensuring flight notification has been coordinated with CENSAR/Ops and stakeholders (where necessary).	2 Unlikely	3 Moderate	**L2 Low**
2.8	All persons listed to fly have been authorised and manifested in accordance with SOPs	2 Unlikely	2 Minor	**L5 Low**	Mission Commander conducts pre-mission brief which includes ensuring all crew/pax are authorised and have been briefed.	1 Rare	2 Minor	**L6 Low**

Phase 2 Risk Evaluation - Pre-flight planning, briefing / de-briefing (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the planning of a mission and the pre-mission briefing and the post-flight de-briefing

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
2.9	Cargo that is to be carried has not been adequately weighed or assessed leading to poor weight and balance calculations and/or a possible dangerous goods-related incident.	3 Possible	2 Minor	**L4 Low**	Mission Commander conducts pre-mission brief which includes ensuring all crew/pax have provided the PIC with all the relevant information regarding cargo weight and contents for him/her to assess and conduct flight perforamance calculations	2 Unlikely	2 Minor	**L5 Low**
2.10	Aircraft-related logistics such as fuel, hangarage, airside access, survival and rescue equipment not coordinated leading to mission delays	2 Unlikely	3 Moderate	**L2 Low**	Mission Commander conducts pre-mission brief which includes ensuring the PIC has completed logistics planning for the mission	1 Rare	3 Moderate	**L3 Low**
2.11	Mission-related logistics such as accommodation, food, authorisations and permissions, risk ownerships, staffing, transport, reporting, and similar are not coordinated leading to mission delays or pre/ post mission problems.	3 Possible	2 Minor	**L4 Low**	Mission Commander liaises with SBFC and/or campaign manager to ensure logistics issues are coordinated in a timely manner and briefs all members of crew prior to day's mission.	2 Unlikely	2 Minor	**L5 Low**

Phase 2 Risk Evaluation - Pre-flight planning, briefing / de-briefing (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the planning of a mission and the pre-mission briefing and the post-flight de-briefing

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Like-lihood	Con-sequence	Residual Risk Rating
2.12	Briefing is unclear or difficult to understand and crew responsibilities, roles, arcs of scan, seating positions, status of command not clarified before flight leading to mis-communication, misunderstanding and possible interpersonal friction.	4 Likely	3 Moderate	**H5 High**	MC conducts briefing in an unambiguous way in a location conducive to communication and clearly mandates crew responsibilities, roles, seating positions, their arcs of scan and the expectations from them. MC asserts his/her role as the person responsible for the mission and its outcomes. MC asserts the PIC's responsibility for the safe, legal and efficient control of the aircraft in order to achieve mission aims.	2 Unlikely	3 Moderate	**L2 Low**
2.13	Fatiguing activities being undertaken by crew members leading to individuals being fatigued prior to starting flight duties and a reduction in cognitive abilities and a reduction in the maintenance of safety.	3 Possible	3 Moderate	**M3 Medium**	MC conducts crew brief and asks for verbal confirmation that all crew members are fit for flight; all crew members undertake mission crew training/TRM training highlighting crew responsibilities and effects of fatigue; all crew members aware that they can cut sortie short or ask for breaks to help with fatigue management.	2 Unlikely	3 Moderate	**L2 Low**

Phase 2 Risk Evaluation - Pre-flight planning, briefing / de-briefing (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the planning of a mission and the pre-mission briefing and the post-flight de-briefing

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Like-lihood	Con-sequence	Residual Risk Rating
2.14	Pre-flight briefing outcomes not recorded or passed on to SBFC as part of the flight authorisation / tracking process leading to lessons not being learnt and the same mistakes being committed or inefficiencies being repeated, or unauthorised persons / activities being involved in the mission, or risk not being accepted at the appropriate level.	4 Likely	3 Moderate	**H5 High**	Mission Commander must get authorisation to fly in accordance with the SOP. Pre-flight briefing package completed and details sent to SBFC for review and tracking.	2 Unlikely	3 Moderate	**L2 Low**
2.15	Post-flight debriefing not conducted nor lessons recorded and passed on to SBFO as part of the backbriefing process leading to lessons not being learnt; the risk register not being updated; and mistakes or inefficiencies being repeated.	4 Likely	3 Moderate	**H5 High**	Mission Commander not permitted to close the flight until debriefing points completed and results of the mission passed to SBFC for recording.	2 Unlikely	3 Moderate	**L2 Low**
2.16	Duty day/flying hours exceed recommended guidelines leading to excessive fatigue which reduces efficiency or can lead to a fatigue-related incident or accident on board the aircraft of in a vehicle.	4 Likely	3 Moderate	**H5 High**	Duty day not to be planned to exceed 10 hrs/12 hrs (dependent on context). Any extension of duty day to be authorised by campaign coordinator. Duty day to include travel time. No commencement of travel home after 5pm local time.	3 Possible	3 Moderate	**M3 Medium**

Phase 3 Risk Evaluation - Aircraft and equipment preparation

This set of risk evaluations concerns those threats and likelihoods that may occur during the preparation and loading of the aircraft and mission equipment required for the mission.

Environment will normally be within the accommodation or at an airfield or similar place where mission equipment or aircraft and aircraft equipment are being prepared and loaded.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
3.1	Aircraft instrumentation, GPS integrity,fuel quality, fuel and oil levels, mandatory equipment not checked impacting the mission effectiveness and possibly violating CASRs	2 Unlikely	2 Minor	**L5 Low**	Mission Commander briefs this as part of the pre-mission brief. Responsibility to PIC as per CASRs	1 Rare	2 Minor	**L6 Low**
3.2	Aircraft doors, hatches, control locks and latches not checked nor aircraft configured for low level aerial inspection flights leading to mission abort or delays.	2 Unlikely	3 Moderate	**L2 Low**	Mission Commander briefs this as part of the pre-mission brief. Responsibility to PIC as per CASRs	1 Rare	3 Moderate	**L3 Low**

Phase 3 Risk Evaluation - Aircraft and equipment preparation (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the preparation and loading of the aircraft and mission equipment required for the mission.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
3.3	Recording equipment (eg cameras/PEDs)and other mission equipment not checked prior to flight resulting in mission delays to rectify.	3 Possible	2 Minor	**L4 Low**	Mission Commander briefs this as part of the pre-mission brief. Responsibility to ASO to check prior to flight.	2 Unlikely	2 Minor	**L5 Low**
3.4	PPE not worn or worn incorrectly resulting in reduced protection for wearer to mitigate against injury	2 Unlikely	3 Moderate	**L2 Low**	Mission Commander briefs this as part of the pre-mission brief. Responsibility of each member to adhere to SOPs and to check each other. Mission Crew trained on a mission crew course on SOPs and the use of PPE.	2 Unlikely	2 Minor	**L5 Low**
3.5	Cabin not prepared properly and safety equipment not properly used to ensure equipment and cargo and personnel are secured resulting in unsecured objects flailing in the cabin during turbulence or during an impact.	2 Unlikely	4 Major	**M2 Medium**	Mission Commander briefs this as part of the pre-mission brief. Responsibility of each member to adhere to SOPs and to check each other and equipment is secured correctly. Mission Crew trained on a mission crew course on SOPs and the use of on board safety equipment and harnesses.	2 Unlikely	3 Moderate	**L2 Low**

Phase 4 Risk Evaluation - Start, taxi, take-off

This set of risk evaluations concerns those threats and likelihoods that may occur during start up of the aircraft, any loading, manoeuvring, take off and climb to transit altitude

Environment will normally be at the aerodrome/HLS and the area around it. The HLS may be at an unprepared location (eg bush setting). Transit altitude can be anywhere above 500' above the highest obstacle.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
4.1	Personnel not applying safe work procedures and thereby injuring themselves during engine start sequence or during approach to aircraft by rotor blades, tail rotor blades or exhausts leading to injury or death.	2 Unlikely	4 Major	**M2 Medium**	All personnel trained in aircraft safety through a Mission Crew course which includes, where possible, practical activities in operating in and around an operating aircraft on the ground and in flight and the theory included in Working Safely Around Aircraft.	1 Rare	4 Major	**L1 Low**
4.2	Onlookers or animals not controlled leading to an injury during the engine start sequence or an unauthorised approach to aircraft due to rotor blades, tail rotor blades or exhausts resulting in injury or death.	2 Unlikely	4 Major	**M2 Medium**	Mission crew to assist with HLS safety. Ground personnel (if available) to assist with HLS safety. Onlookers briefed by mission crew on dangers of approaching the aircraft and encroaching on the HLS, especially kids or animals. Mission crew member to remain on ICS while standing outside aircraft to monitor HLS during start and run up and then boarding immediately prior to departure (where possible. PIC & MC to coordinate if reqd).	1 Rare	4 Major	**L1 Low**

Phase 4 Risk Evaluation - Start, taxi, take-off

This set of risk evaluations concerns those threats and likelihoods that may occur during start up of the aircraft, any loading, manoeuvring, take off and climb to transit altitude

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Like-lihood	Con-sequence	Residual Risk Rating
4.3	Unnecessary chatter during demanding flight sequences such as take off distracts pilot resulting in missed radio calls, missed traffic leading to separation breakdown.	3 Possible	3 Moderate	**M3 Medium**	All personnel trained in aircraft safety through a Mission Crew course which includes, where possible, practical flight assessment and the requirements for sterile cockpit procedures during critical phases of flight. MC to confirm this requirement to other crew members and confirm with pilot during the campaign and will rectify any lapses by immediate action and debriefing.	2 Unlikely	3 Moderate	**L2 Low**
4.4	Unobserved or unreported obstacles affect the taxi and take off phase by proximity or collision. (Obstacles could be static such as powerlines, or mobile, such as other traffic).	3 Possible	3 Moderate	**M3 Medium**	Mission crew identify and nominate seen obstacles or potential traffic before start. Mission crew identify and nominate newly seen obstacles and other traffic during taxi and take off phase. Mission crew announce when obstacles (known or newly seen) or traffic appear to be a threat or becoming a threat. PIC to assist with developing Mission Crew safety distance judgment by describing threat distances. PIC to be briefed that Mission Crew will not hesitate to announce any obstacle or concern. MC to reinforce in all members of mission crew that it is their responsibility to speak up, regardless.	2 Unlikely	3 Moderate	**L2 Low**
4.5	Rotor/prop wash causes damage or causes foreign objects and debris to cause damage.	5 Almost Certain	2 Minor	**M4 Medium**	HLS and local area checked for loose items that may be impacted by rotor/prop wash and loose items removed or secured. Cars and other valuable machinery moved away from critical area to avoid 'sandblasting' effect. Onlookers warned to beware of FOD, sand, dirt, etc	3 Possible	2 Minor	**L4 Low**

Phase 5 Risk Evaluation - Transit to/from aerial inspection area

This set of risk evaluations concerns those threats and likelihoods that may occur during the transit phase as well as generic in-flight emergencies

Environment will normally be at the aerodrome/HLS and the area around it. The HLS may be at an unprepared location (eg bush setting). Transit altitude can be anywhere above 500' above the highest obstacle.

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
5.1	Navigation and flight route inadequately flown or planned leading to airspace incursion.	3 Possible	3 Moderate	**M3 Medium**	Pre-flight brief includes requirement for PIC to brief on all relevant active airspace and Prohibited, Restricted and Danger Areas and specific start and stop locations for fire trail aerial inspections. PIC and MC collude to choose most appropriate flight route in order to meet mission targeted outcomes for aerial inspection.	2 Unlikely	3 Moderate	**L5 Low**
5.2	Other traffic not sighted leading to loss of separation or near collision	2 Unlikely	4 Major	**M2 Medium**	All crew reminded of their scan arcs of responsibility and maintain vigilance during transit. PIC maintains appropriate listening watch on area and terminal frequencies. ADS-B enhanced situational awareness devices may assist	1 Rare	4 Major	**L1 Low**
5.3	Small RPAS operating above their authorised altitude or operating without notification leading to impact or loss of separation	3 Possible	3 Moderate	**M3 Medium**	NOTAMS checked; mandated min/max altitudes for separation maintained for as long as possible while en route; likely areas for Small RPAS use identified; all crew maintain their arcs of scan responsibilities; any sightings that may indicate a violation are reported. ADS-B enhanced situational awareness devices may assist	2 Unlikely	3 Moderate	**L2 Low**

Phase 5 Risk Evaluation - Transit to/from aerial inspection area (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the transit phase as well as generic in-flight emergencies

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
5.4	Flexible wing aircraft (eg hang gliders, parasails) operating near aerial inspection areas and without radio become a separation hazard at altitudes above and below 500 ft.	3 Possible	3 Moderate	**M3 Medium**	NOTAMS checked; charts checked for identified hang glider areas; all crew maintain their arcs of scan responsibilities	2 Unlikely	3 Moderate	**L2 Low**
5.5	Birds pose a navigational hazard or, in the case of Wedge Tail Eagles, an aggressive physical hazard leading to abrupt evasive manoeuvres and possible aircraft damage or occupant injury/distress.	3 Possible	3 Moderate	**M3 Medium**	Mission crew remain vigilant especially in areas likely to be occupied by birds. Nominate any eagles, especially thos above the aircraft; PIC to take circuitous flight route if required. All crew and internal loads remain secured. All crew to ensure PPE is secured.	2 Unlikely	3 Moderate	**L2 Low**
5.6	Weather conditions deteriorate below VMC leading to mission delay or mission abort.	2 Unlikely	3 Moderate	**L2 Low**	PIC and MC determine likely weather conditions prior to mission start and come up with contingency plans which may include mission cancellation; mission delay; alternative target areas. If weather deteriorates during the mission to below Helo VMC, PIC is to divert and return to base or other suitable location. If unable to RTB or divert, then he/she is to land to await weather to clear and then RTB.	1 Rare	3 Moderate	**L3 Low**

Phase 5 Risk Evaluation - Transit to/from aerial inspection area (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the transit phase as well as generic in-flight emergencies

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
5.7	Weather conditions remain above VMC but thunderstorms / hail / microburts pose a threat to flight safety.	2 Unlikely	3 Moderate	**L2 Low**	PIC and MC determine likely weather conditions prior to mission start and come up with contingency plans which may include mission cancellation; mission delay; alternative target areas. If weather deteriorates during the mission to levels that don't allow for continuation, PIC is to divert and return to base or other suitable location. If unable to RTB or divert, then he/she is to land to await weather to clear and then RTB.	1 Rare	3 Moderate	**L3 Low**
5.8	Turbulence or windshear pose a threat to flight safety.	3 Possible	3 Moderate	**M3 Medium**	PIC and Mission Commander determine likely weather conditions prior to mission start. Turbulence associated with wind and terrain is to be taken into account during route planning and contingency plans developed if turbulence does not allow for an effective aerial inspection.	2 Unlikely	3 Moderate	**L2 Low**
5.9	Doors or windows are open and items are not secured correctly resulting in objects falling from the aircraft.	3 Possible	2 Minor	**L4 Low**	Mission crew are trained in Mission Crew duties and Working Safely Around Aircraft; cabin is prepared for flight including for any doors off/windows open flight; cargo and cabin contents are secured and lanyarded where possible; all crew and passengers are briefed.	2 Unlikely	2 Minor	**L5 Low**

Phase 5 Risk Evaluation - Transit to/from aerial inspection area (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the transit phase as well as generic in-flight emergencies

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
5.10	Fatiguing activity of flight leads to sub-optimum performance that may lead to poor aerial inspection results.	4 Likely	3 Moderate	**M5 Medium**	Mission Crew is trained in TRM and human perf. limitations and accounts for chrono-biological dips (after lunch 'slump') and late afternoon fatigue. Mission Crew nominate when they are feeling sub-optimal; plan factors in opportunities for rest breaks during this period (eg scheduled refuelling stops; 10-min breaks on the ground, etc) or sorties managed to avoid periods of low performance.	2 Unlikely	3 Moderate	**L2 Low**
5.11	Fatiguing activity of flight leads to sub-optimum crew performance that may lead to safety breakdowns that may, in turn, lead to a near miss or accident.	4 Likely	3 Moderate	**M5 Medium**	Mission Crew is trained in TRM and human performance limitations and accounts for chronobiological dips (after lunch 'slump') and late afternoon fatigue. Mission Crew nominate when they are feeling sub-optimal; crew factors in opportunities for walking around during this period (eg scheduled refuelling stops; 10-minute breaks on the ground, etc) or sorties managed to avoid periods of low performance.	2 Unlikely	3 Moderate	**L2 Low**
5.12	Flight, and the use of PEDs or other devices, causes motion sickness which leads to a crew member becoming mission ineffective.	4 Likely	3 Moderate	**M5 Medium**	Mission crew are selected based on their suitability for persistent flight duties (ie not prone to motion sickness); Limited use of PEDs or rotation of the use of PEDs (where possible) to minimise the chance of motions sickness; regular breaks from looking at PEDs; regular breaks for mission crew to recover from the effects of flight.	2 Unlikely	3 Moderate	**L2 Low**

Phase 5 Risk Evaluation - Transit to/from aerial inspection area (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the transit phase as well as generic in-flight emergencies

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
5.13	Engine or powertrain malfunction leads to forced landing.	2 Unlikely	4 Major	**M2 Medium**	Aircraft is flown at an altitude/speed combination and flight route that maximises the likelihood of a successful autorotation/ forced landing whenever possible; aircraft maintenance program is in accordance with CASRs and OEM recommendations;	1 Rare	4 Major	**L1 Low**
5.14	Effects of crash such as impact, secondary impact (rolling), collapse of cabin, unsecured objects and flailing and post impact fire become mechanisms of injury.	2 Unlikely	4 Major	**M2 Medium**	All personnel wear PPE as per SOPs; mission crew undertake mission crew training which includes the theory of crash positions; the efficacy of safety equipment and PPE; human performance limitations in a crash; requirements of NSW Aviation SOPs	1 Rare	4 Major	**L1 Low**
5.15	Survivors of forced landing required to survive for an extended period prior to SAR.	1 Rare	4 Major	**L1 Low**	CASRs require survival equipment and supplies suitable for the area being flown; contractor requires satellite tracking capability on all aircraft; all aircraft to be fitted with ELT; personnel carry PLBs; Flight notifications submitted prior to flight; OPS Normal calls where appropriate; all persons on board are manifested and briefed to the DPE prior to the mission.	1 Rare	4 Major	**L1 Low**

Phase 6 Risk Evaluation - Low flying / aerial inspection

This set of risk evaluations concerns those threats and likelihoods that may occur during the low flying aerial inspection phase.

Environment will normally be at the aerodrome/HLS and the area around it. The HLS may be at an unprepared location (eg bush setting). Transit altitude can be anywhere above 500' above the highest obstacle.

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Like-lihood	Con-sequence	Residual Risk Rating
6.1	Powerlines and masts and other hazards pose a threat during low level flight which may need to be taken into account for the purpose of the aerial inspection or for the safety of the flight (ie impact), however the nature of fire trails is that they are rarely located close to powerlines that cannot be identified easily and avoided	3 Possible	4 Major	**H3 High**	PIC has low flying endorsement and is experienced in low level operations. All crew have had the opportunity to undertake training that includes identifying wires and other hazards to low flying; Crew has TRM training to maximise team cooperation during critical operations especially the requirements to nominate ALL likely hazards regardless; aerial inspection area references (maps, info) checked as part of mission planning, obstructions identified and briefed to the crew; high level 360 deg recce conducted before descending below 500' AHO, operations to be conducted in visibility conditions conducive to seeing and identifying powerlines and masts and other hazards; aircraft used complies with minimum contract requirements for power availability (AS350B3 Squirrel at time of writing); exposure at low level is minimised to start and stop of trail being aerial inspectioned then aircraft ascends to above 500' AHO	1 Rare	4 Major	**L1 Low**
6.2	aerial inspection requires flight at extremely low level resulting in inadvertant terrain impact.	3 Possible	4 Major	**H3 High**	Flight at extreme low level for aerial inspection would be rare and if necessary would be at a hover or very slow forward speed; PIC is experienced in low level operation; aircraft has suitable power margins to permit HOGE operations with excess power for climb out and PIC confirms this as part of daily flight planning; extreme low level flight is briefed and crew is prepared and vigilant for obstructions, persons or animals; sterile cockpit procedures enforced; time at extreme low level is minimised to that time necessary to gather data and then regular aerial inspection procedures and altitudes are resumed.	1 Rare	4 Major	**L1 Low**

Phase 6 Risk Evaluation - Low flying / aerial inspection (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the low flying aerial inspection phase.

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Like-lihood	Con-sequence	Residual Risk Rating
6.3	Engine failure at low level results in forced landing which is likely to be conducted within the avoid curve of the height velocity graph indicating a reduced likelihood of a successful forced landing.	3 Possible	4 Major	**H3 High**	(Flight within the avoid area for low level aerial inspection will not be unusual however engine failure is extremely unusual). PIC is experienced at low level operations and will be cognisant of areas for forced landings at all times; all personnel and cargo to be secured for low level flight; all PPE will be worn correctly; mission crew have been trained in TRM and low flying hazards; mission crew have been briefed on human performance limitations including crash position theory; mission crew have been briefed by PIC on aircraft design features; flight at low level is minimised to that required for aerial inspection; aircraft maintenance is up to date and vetted as part of EOI process and auditing; engine power checks regularly carried out for trending and assurance;	2 Unlikely	4 Major	**M2 Medium**
6.4	Low level turbulence results flight controllability difficulties; disruption to cabin operations and possible terrain collision.	2 Unlikely	4 Major	**M2 Medium**	Turbulent conditions predicted based on environmental conditions, terrain and forecast winds; PIC is able to judge likelihood of turbulence and can navigate accordingly; fire trails in areas prone to low level turbulence to be prioritised for days that are conducive to a low level aerial inspection; all mission crew wear PPE and they and cargo are well secured; aircraft performance allows for flight out of turbulent conditions.	1 Rare	4 Major	**L1 Low**

Phase 6 Risk Evaluation - Low flying / aerial inspection (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the low flying aerial inspection phase.

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
6.5	Power available is insufficient for the required flight regime. (This relates to an engine performing normally and not malfunctioning)	2 Unlikely	4 Major	**M2 Medium**	PIC is experienced in low-level flight; PIC operates the aircraft in such a way so as to avoid the necessity for high power settings at low level; PIC ensures available power through power assurance checks and conducts the flight well within the available power; aircraft used is in accordance with contractual arrangements for aircraft type and performance (AS350B3 at time of writing)	1 Rare	4 Major	**L1 Low**
6.6	Incorrect handling leads to terrain impact or near miss due to vortex ring state or loss of tail rotor effectiveness or rapid rate of descent at low altitude.	2 Unlikely	4 Major	**M2 Medium**	PIC is experienced in low-level flight; PIC operates the aircraft in such a way so as to avoid the necessity for high power settings at low level; PIC ensures available power through power assurance checks and conducts the flight well within the available power.	1 Rare	4 Major	**L1 Low**
6.7	Occupied buildings, persons, livestock are close to aerial inspection area and fall within the minimum distance requirements for a formal Air Work Zone.	2 Unlikely	3 Moderate	**L2 Low**	PIC and Mission Crew are vigilant for buildings, persons or animals close to the aerial inspection route and will avoid the object/person/animal in accordance with Part 138 of the CASRs (ie > 150m) or shall make public notification and engage in consulation in accordance with CASR Part 138.	1 Rare	3 Moderate	**L3 Low**

Phase 6 Risk Evaluation - Low flying / survey (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the low flying survey phase.

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
6.5	Power available is insufficient for the required flight regime. (This relates to an engine performing normally and not malfunctioning)	2 Unlikely	4 Major	**M2 Medium**	PIC is experienced in low-level flight; PIC operates the aircraft in such a way so as to avoid the necessity for high power settings at low level; PIC ensures available power through power assurance checks and conducts the flight well within the available power; aircraft used is in accordance with contractual arrangements for aircraft type and performance (AS350B3 at time of writing)	1 Rare	4 Major	**L1 Low**
6.6	Incorrect handling leads to terrain impact or near miss due to vortex ring state or loss of tail rotor effectiveness or rapid rate of descent at low altitude.	2 Unlikely	4 Major	**M2 Medium**	PIC is experienced in low-level flight; PIC operates the aircraft in such a way so as to avoid the necessity for high power settings at low level; PIC ensures available power through power assurance checks and conducts the flight well within the available power.	1 Rare	4 Major	**L1 Low**
6.7	Occupied buildings, persons, livestock are close to survey area and fall within the minimum distance requirements for a formal Air Work Zone.	2 Unlikely	3 Moderate	**L2 Low**	PIC and Mission Crew are vigilant for buildings, persons or animals close to the survey route and will avoid the object/person/animal in accordance with Part 138 of the CASRs (ie > 150m) or shall make public notification and engage in consulation in accordance with CASR Part 138.	1 Rare	3 Moderate	**L3 Low**

Phase 7 Risk Evaluation - Approach, landing and off-site landings

This set of risk evaluations concerns those threats and likelihoods that may occur during the approach to land sequence and ground manoeuvring at prepared or unprepared aerodromes and HLS

Environment will normally be from 500' Above the highest obstacle descending to the aerodrome/HLS and manoeuvring in the area around it. The HLS may be at an unprepared location (eg bush setting).

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
7.1	Approach to fixed aerodrome results in flight through airspace likely to be shared by other users leading to loss of separation.	2 Unlikely	1 Insignificant	**L10 Low**	Sterile cockpit procedures; mission crew is briefed on the approach and assists PIC with lookout and listen out for obstacles and traffic.	1 Rare	1 Insignificant	**L11 Low**
7.2	Approach to HLS results in flight through area not aerial inspectioned or which may potentially have unseen obstacles such as wires.	3 Possible	4 Major	**H3 High**	Sterile cockpit procedures; mission crew is briefed on the approach and assists PIC with lookout and listen out for obstacles and other hazards; aircraft performance allows for double-angle approach (OGE approach) and departure; PIC is experienced in landings to unprepared sites; All crew have had the opportunity to undertake training that includes identifying wires and other hazards to low flying; Crew has TRM training to maximise team cooperation during critical operations especially the requirements to nominate ALL likely hazards regardless	1 Rare	4 Major	**L1 Low**

Phase 7 Risk Evaluation - Approach, landing and off-site landings (cont.)

This set of risk evaluations concerns those threats and likelihoods that may occur during the approach to land sequence and ground manoeuvring at prepared or unprepared aerodromes and HLS

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
7.3	Manoeuvring at low level to land may place aircraft at risk of hitting unseen obstructions (eg in tall grass) or landing on uneven ground or being affected by obstacles, loose items, other aircraft, onlookers and animals.	3 Possible	4 Major	**H3 High**	Sterile cockpit procedures; mission crew is briefed on the approach and assists PIC with lookout for obstacles and other hazards; PIC is experienced in landings to unprepared sites; All crew have had the opportunity to undertake training that includes identifying wires and other hazards to low flying; Crew has TRM training to maximise team cooperation during critical operations especially the requirements to nominate ALL likely hazards regardless.	1 Rare	4 Major	**L1 Low**
7.4	Landing at an aerodrome or HLS brings aircraft within hazardous area due to onlookers, animals or obstructions and obstacles becoming close to the aircraft.	3 Possible	3 Moderate	**H3 High**	Sterile cockpit procedures; mission crew is briefed on the approach and assists PIC with lookout for obstacles and other hazards; PIC is experienced in landings to unprepared sites; All crew have had the opportunity to undertake training that includes Working Safely Around Aircraft and Mission Crew training; MC may allocate a person to disembark in order to ensure HLS security from onlookers, especially children or animals.	1 Rare	3 Moderate	**L3 Low**

Phase 8 Risk Evaluation - Refuelling and other ground activities

This set of risk evaluations concerns those threats and likelihoods that may occur during a pause in the aerial inspection for refuelling or other ground maintenance.

Environment will normally be at the aerodrome/HLS and the area around it. The HLS may be at an unprepared location (eg bush setting). Refuel may be from drum stock or by ground support personnel or at an aerodrome with refuel services (manual or driver and tanker).

Serial	Threat	Likelihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
8.1	Preparing for off-site refuelling requires man-handling drums of fuel leading to accidents or injuries related to movement of heavy objects.	2 Unlikely	2 Minor	**L6 Low**	Safe work practices related to manoeuvring heavy objects are used. PIC and refueller (if avail) to supervise DPE personnel who may help. Use of mechanical assistance recommended if available.	1 Rare	2 Minor	**L11 Low**
8.2	Refuelling of aircraft leads to heightened danger of ignition and ensuing fire.	2 Unlikely	4 Major	**M2 Medium**	Precautions in accordance with Part 91 of CASRs (no ignition sources / PEDs within 15m) are adhered to; fire-fighting equipment is located within 6 to 15 metres; unneccessary personnel remain at least 15 metres away.	1 Rare	4 Major	**L1 Low**

Phase 8 Risk Evaluation - Travelling whilst on duty

This set of risk evaluations concerns those threats and likelihoods that may occur during the travel to or from duty during the course of a work day.

Environment will normally be driving on urban, suburban or rural roads and highways.

Serial	Threat	Like-lihood	Con-sequence	Inherent Risk Rating	Controls	Likelihood	Con-sequence	Residual Risk Rating
8.3	Person is fatigued from flight duty roster and must travel a significant distance to return home at the end of the day's duty leading to excessive fatigue causing an incident or an accident during the journey.	3 Possible	4 Major	**H2 High**	Rosters adjusted to allow for travel to account for time of day of proposed travel; MC conducts brief/de-brief and each crew member provides assessment of his/her fatigue levels; Work day (incl travel) not to exceed 12 hours); travel time in hours calculated as distance/80 (ie travel time for 100km =100km/80 = 1.25 hrs) and administrative time calculated at one hour before commencing flight-related duty and one hour after finishing flight-related duty. (See text in manual for an explanation)	1 Rare	4 Major	**L1 Low**
8.4	Crew is not provided adequate time or facilities or conditions condusive to effective sleep or appropriate rest leading to excessive fatigue which can lead to reduced cognitive performance or reduction in safety maintenance abilities or reduction in hand/eye skills resulting in an aviation or road incident or accident.	3 Possible	4 Major	**H2 High**	Accommodation is suitable in being hotel-like with conditions condusive to rest; rosters allow for at least 7 hours uninterrupted sleep prior to commencing flight-related duties; accommodation available for after flight duty use in the event that self-drive travel will take place past 10pm after a duty day or the work day exceeds 12 hours.	1 Rare	4 Major	**L1 Low**

	CROWN LANDS AERIAL INSPECTION FLIGHT SMEACS BRIEF Use this SMEACS format to plan a mission and conduct the mission brief
1	**SITUATION AND PRELIM INFO (confirm with PIC prior to crew brief)**
	Topography - Area/trails to be worked/transited identified (use map/mud map if poss)
	Key hazards known - Powerlines, terrain, airspace, sensitive areas
	Other assets - Support pers, landing sites, emergency services
	Meteorology - Forecasts, observations, sun & wind direction, rain, likely obscurations
	Notifications - Landowners, SAR/Flight following, flight auth, PR plan, public notices
2	**MISSION - A statement of the aim and outcome (State Who, What, When, Why)**
3	**EXECUTION - An outline of how the mission will be run**
	Timings - Travel to airfield, start/take off, endurance, refuels, breaks, on station,
	off station, expected end of mission and destination, 8 flt hrs maximum
	Tracks / Altitudes - Use map/mud map if poss to describe tracks to be flown
	Crew tasks - Pilot, MC, AOBs, Grnd supt, others
	Scan & duties - Visual arcs of responsibility, traffic/obstacles, nav, radios, other duty
	Any special consids - Acft performance, cargo, landing sites/airfields, pax, tasks
	Cargo and CG - Cargo weighed. Pilot informed of cargo. Pilot confirms CG
3b	**Contingencies - Actions on expected or unexpected events**
	Emergencies - forced landing SOPs, warning lights, use of checklists, ICS failures
	Weather - Bad WX in flight. Bad WX after landing (PIC to provide advice)
	Risk Mngt - All likely risks ID'd, controls instigated. New risks reported with flight auth
4	**ADMINISTRATION AND LOGISTICS**
	Mission Eqpt - Checked/ready/secured/accessible/spare power
	Personal & Survival Eqpt - PLBs, water, food checked, secured
	Accom & Transport - Coordinated
	Dangerous Goods - Pilot notified, DG prepared, paperwork done, loaded or carried
	Fuel/Oil - Refuellers notified, locations and timings coordinated
	Rations - B'fast-lunch-dinner / dring breaks, locations, timings
	Briefings - All briefs completed, pax briefs confirmed, special briefs done
	Personnel - Qualified, current, no physical/psych issues, IMSAFE checks
5	**COMMAND AND COMMUNICATIONS**
	Mission Command - Describe duties and authority
	Aircraft (PIC) Command - Describe duties and authority
	Company/Org - Requirements of the task. POC details.
	Comms - Freqs ID'd/checked, eqpt checked/ready, back ups, phone nos for ea pers.
6	**SAFETY, QUESTIONS, ADDITIONAL POINTS**
	Risks and Safety - Any concerns? Any final questions?
	Duty times confirmed - 10 hr duty day max / 12 hrs with auth / 8 hrs flying max
	Debrief - Location and time, backbrief to coordinator after crew debrief, check flt hrs
	Pilot Brief - Hand over to pilot for his/her brief if necessary/reqd.
	Complete Flight Auth details to submit to campaign coordinator
	Pre-flight inspection, fuel check, final walkaround - for flight crew
	HLS Security - ID likely hazards, caution onlookers, assign security if reqd

CROWN LANDS AERIAL INSPECTION FLIGHT AUTHORISATION FORM

Complete as much of this form as possible prior to the crew brief. After the crew brief, complete the remainder of this form and send it (or an image of it) to the campaign coordinator.
If sent electronically, save as YYMMDD_Flight_Auth_Brief and then email it

Mission No or area to be worked		**Date** (YYMMDD)	
Mission Commander (Name and ph no)		**Pilot in Command** (Name and ph no)	
Air Observer 1 (Name and ph no)		**Air Observer 2** (Name and ph no)	
Other crew/pax (Name and ph no)		**Ground Support Pers** (Name and ph no)	
Crew Inspection Day		**Handover required at end of day?**	
Media?		**If yes, location and approx time**	

Trails to be inspected

Anticipated landing sites			
Reason for landing			
Weather			

Any risk management or safety issues

Any administrative issues or requests

Is the crew fit for the mission?		**Are all briefings complete?**		**Will a duty day extension be requested?**	

Backbrief information (complete this section after flying, save it and email it to campaign coordinator**)**

Handover completed		**Did the mission/s run as planned?**		**Hours flown** (verify with PIC)	

Provide a word picture on any issues that management needs to be aware of

Form created by IPAS. Comments to conway@ipas.com.au

2022

January

Wk	Mo	Tu	We	Th	Fr	Sa	Su
52						1	2
1	3	4	5	6	7	8	9
2	10	11	12	13	14	15	16
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February

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March

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April

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May

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June

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July

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August

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September

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November

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December

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2023

January

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February

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April

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July

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August

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September

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October

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December

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2024

January

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February

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March

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April

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May

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June

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August

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35	26	27	28	29	30	31	

September

Wk	Mo	Tu	We	Th	Fr	Sa	Su
35							1
36	2	3	4	5	6	7	8
37	9	10	11	12	13	14	15
38	16	17	18	19	20	21	22
39	23	24	25	26	27	28	29
40	30						

October

Wk	Mo	Tu	We	Th	Fr	Sa	Su
40		1	2	3	4	5	6
41	7	8	9	10	11	12	13
42	14	15	16	17	18	19	20
43	21	22	23	24	25	26	27
44	28	29	30	31			

November

Wk	Mo	Tu	We	Th	Fr	Sa	Su
44					1	2	3
45	4	5	6	7	8	9	10
46	11	12	13	14	15	16	17
47	18	19	20	21	22	23	24
48	25	26	27	28	29	30	

December

Wk	Mo	Tu	We	Th	Fr	Sa	Su
48							1
49	2	3	4	5	6	7	8
50	9	10	11	12	13	14	15
51	16	17	18	19	20	21	22
52	23	24	25	26	27	28	29
1	30	31					