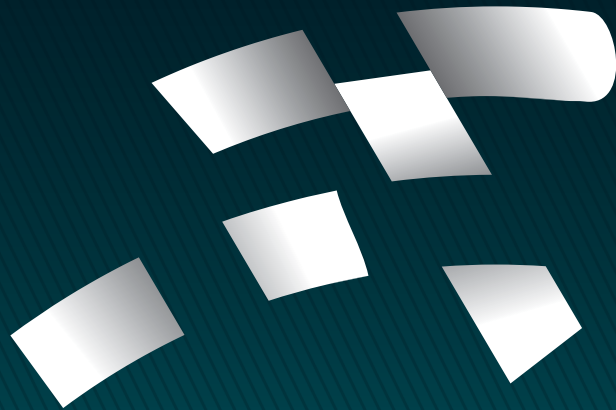




NEW ZEALAND
SPACE AGENCY

Safety Case Guidance

ENSURING A SAFE, RESPONSIBLE
AND SECURE SPACE INDUSTRY



MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Contents

Safety Case Guidance	2
Public Safety	2
The importance of a Safety Case	2
Your safety duty	3
What is a Safety Case?	3
Legal requirements	4
Outer Space and High-altitude Activities Act 2017	4
Outer Space and High-altitude Activities (Licences and Permits) Regulations 2017	4
Developing a Safety Case	5
Planning for the safety case	5
Description of Activities	5
Safety Commitment and Goals	5
Safety Critical Systems and Safety Assessment	6
Personnel and Resources	6
Identification and Management of Risks	7
Verification of Safety Systems – Assurance	8
Emergency Management Planning	9
Varying the Safety Case	9
Satisfying the Minister of Changes	9
Formatting and Structure	10
Contact Details	10

Disclaimer

This document is not intended to be read as prescriptive requirements for the production of a safety case. This document is a guideline only and should not be used as a substitute for legislation or independent expert advice.

Where this document is inconsistent with the Act and/or relevant Outer Space or High-altitude regulations, the Act and those regulations prevail. There may be factors taken into account in any application process, transaction or decision that are not covered by these guidelines. Adherence to these guidelines does not guarantee a particular outcome.

The New Zealand Space Agency is not responsible for the results of any action taken on the basis of the information in this document, or for any errors or omissions. The New Zealand Space Agency may vary this document at any time without notice.

Photo on inside front cover: "River Crossing" by Mark Gee
Photo on inside back cover: "St Clair's Milky Way" by David Willing

Safety Case Guidance

The purpose of this document is to provide applicants with guidance that will help prepare a safety case that adds value to their organisation and provides assurance that critical public safety risks have been identified and are suitably controlled.

Applicants will need to demonstrate that they understand and can manage the critical safety risks that they could be exposing members of the public and their property to as a result of their operations.

The size and scope of the safety case will be dependent on the nature and complexity of the operation and the safety risks that the public will or could be exposed to as a result.

Public Safety

Regulated parties must ensure that the safety of the public is not put at risk by their conduct or undertakings. Undertakings include all of the activities conducted by the regulated party that support, or are intended to support, launch activities.

The “public” includes every person whose safety could be put at risk by launch activities. The public needs to be protected from any harm that could be caused by launch activities, including the risk of physical injury or death and of damage to property. All reasonable steps to manage, and continue to manage, the risks to public safety must be taken.

The importance of a Safety Case

A safety case will help to drive the applicant to meet its public safety objectives and provides for accountability in doing so. All stakeholders (including the regulator) need to have confidence that applicants have carefully thought through and tested how they will keep the public safe.

An effective safety case will give confidence to all parties that the applicant is committed to having an operation that carefully considers and manages the risks to public safety, and that they have the capability and capacity to do so.

A safety case will help the operation by making it very clear:

- › what the commitments are to public safety;
- › how public safety is promoted within the operation;
- › that the operation has carefully considered how it could create public safety risks, and what those risks are;
- › providing assurance that the controls are appropriate, effective and will be adhered to;
- › making it clear when the public safety commitments are not being met; and
- › that the applicant is always looking to become even safer.

As a participant in the space industry in New Zealand there is the potential that the operations may expose members of the public and their property to the risks that it presents. Should a catastrophic event occur the operation could cause death, serious injury or significant damage to property. Harm may occur to people directly affected by the event, but also to others by association.

If the operation is not managed safely, it will be exposed to significant scrutiny which could result in loss of confidence that could affect the licence to operate, and/or a downturn in business confidence.

Applicants must satisfy the Minister that they are technically capable of conducting the proposed activity safely and that all reasonable steps have been taken to manage the risks to public safety (and will continue to be taken) before a licence can be granted.

Your safety duty

As a licenced space participant you must take, and continue to take, all reasonable steps to manage risks to public safety¹.

In determining what is reasonable, the applicant will first need to consider what is possible. Applicants are expected to identify the risks that the operation will (or could) expose the public to, and to find out what control measures are available to eliminate or minimise those risks to public safety. Applicants will then need to determine what is reasonable to do in their circumstances.

Applicants must provide the highest level of protection to the public that they reasonably can. Generally, applicants may consider cost as a reason not to implement an effective safety control where that cost is *grossly disproportionate* to the public safety risk, but only after fully assessing the options that are reasonably available to eliminate or minimise the harm that could occur should that risk be realised

Applicants may be asked to demonstrate why identified controls that are not implemented, are not reasonable in their circumstances. There should be appropriate evidence to justify decisions.

The Ministry of Business, Innovation and Employment (MBIE) expects that to ensure public safety as a responsible space participant applicants will:

- › engage and consult with workers, stakeholders and others impacted by their operations;
- › identify and understand the hazards and public safety risks that the operations will or could expose others to;
- › identify and develop the people, systems and standards that will be needed given the scope and complexity of the operations to ensure public safety;
- › put in place clear rules, procedures and standards that are expected to be followed by the people involved with the operations;
- › the safety equipment, standards and controls that are selected will be fit for purpose and the most suitable for the operations;
- › verify that controls are functioning as intended, and where issues arise that these will be dealt with and the controls continuously improved;
- › take opportunities to make safety improvements where they are identified, unless it is not reasonable to do so;
- › have suitable plans in place to cope with an unforeseen emergency, and that these will continue to be tested.

What is a Safety Case?

A safety case is a written document that describes through a compelling argument the applicant's commitment to, and plan for, an operation that ensures the safety of the public. *The safety case must be supported by a body of evidence.*

It is important to understand how the safety case will work in the context of your operations, to benefit public safety. The safety case will be a high level document signed off by the applicant's governing Board and Executive leadership team. It will:

- › integrate with the operations management systems and support the applicant to manage the risks to public safety;
- › provide assurance that the applicant understands what risks have been created, or could be created;
- › provide assurance that the systems and controls in place will manage, and continue to manage, these risks;
- › demonstrate how the applicant will gain assurance that the controls are being implemented and that they are effective.

As a minimum applicants will need to ensure that the safety case addresses the requirements of the Outer Space and High-altitude Activities (Licences and Permits) Regulations 2017 ('the regulations').

¹ Outer Space and High-altitude Activities Act 2017 sections 9(1)(b), 25(1)(b), 40(1)(b) & 47(1)(a)(ii)

Legal requirements

Outer Space and High-altitude Activities Act 2017

Applicants must produce a safety case as required by the regulations if applying for any of the following licence types:

- › Launch licence or overseas launch licence
- › Facility licence; and
- › High-altitude licence.

If applicants have a launch licence issued by an international regulator, and they are seeking to have that recognised by MBIE, and that licence is subject to specific public safety duties that are consistent with New Zealand's own regulations, the Minister may take this into account. The applicant should contact MBIE to discuss this, if that is the case.

If the applicant is a person conducting a business or undertaking in New Zealand, they will have additional workplace safety duties. Applicants should refer to WorkSafe and the Health & Safety at Work Act 2015 to ensure full awareness of workplace health and safety duties. Additionally, a number of the Health & Safety at Work regulations may be relevant and again the applicant should ensure full awareness of their duties, and compliance with these regulations.

WorkSafe New Zealand is New Zealand's primary workplace health and safety regulator.

Outer Space and High-altitude Activities (Licences and Permits) Regulations 2017

The regulations require that the following **must** be included in the applicant's safety case:

- › a description of the activities proposed under the licence to which the safety case relates;
- › a description of any systems that have the purpose of preventing, or limiting the effect of, risks to public safety and the failure of which could cause or contribute substantially to a serious risk to public safety;
- › a description of the arrangements in place to verify that the systems described are or will be suitable and will remain in good condition for the duration of the licence;
- › a safety assessment that provides for the identification of any serious risks to public safety associated with the activity, the nature of each risk, including the likelihood and consequences (including the potential magnitude and severity of the potential consequences), the geographical areas likely to be affected by the activity and, if relevant, demographic information about the local community that may be affected by them and the measures that the applicant has implemented, or will implement, to minimise the risks to public safety;
- › details of all relevant New Zealand and international standards that have been applied or will be applied in relation to the safety of the activity;
- › a description of the systems that the applicant has implemented, or intends to implement, for the purpose of ensuring that the activities under the licence are conducted in a manner that does not create a significant risk of serious harm to any member of the public or significant damage to property owned by a person other than the licensee;
- › provides details of the key personnel responsible for the safety of the proposed activities under the licence;
- › includes an emergency plan that effectively addresses all serious risks to public safety of an accident, is specific to the proposed activities under the licence and the serious risks to public safety (if any) identified in the safety assessment, is integrated into the applicant's safety management systems, is understandable by workers, visitors, and other people who are likely to be affected and provides for the testing, review, and updating of emergency procedures (including the frequency of any testing, review, and updating).

Developing a Safety Case

Planning for the safety case

Applicants should ensure that the safety case is presented as a robust argument (not as a summary of the safety management system). The safety case must:

- › be owned by the leadership;
- › be relevant to the organisation;
- › clearly allocate accountability for achieving public safety outcomes; and
- › be able to be tested.

In considering how to structure the safety argument, Figure 1 provides a high-level overview of some of the questions that applicants should ask when considering and planning the development of the safety case .



Figure 1: Safety Case Considerations

Description of Activities

A summary of who (and where) you are, the type of activity you undertake and what is important to your operation is useful context. This information should be focused at a high level. Consider:

- › Who are we and what do we do?
- › Where do we operate?
- › What type of activity do we undertake?
- › How are we governed?
- › When do we operate?
- › Organisational structure

Applicants could look to include within the body of the safety case high-level maps and diagrams of facilities and vehicles as well as organisation charts. Licenses from other regulatory regimes (where relevant) and operational frameworks such as the organisations safety framework are useful supporting evidence.

Safety Commitment and Goals

Safety is a fundamental part of any organisation and must be integrated throughout the management systems. How the leadership will achieve and ensure public safety must be evident. The regulations require applicants to describe the systems that have been (or will be) implemented to protect public safety. It could be useful to include a set of public safety principles that your organisation can use to strongly influence safety culture. Organisational principles should not be a statement of compliance with legislation and regulations. They should be:

- › meaningful;
- › appropriate; and
- › clear enough to prevent ambiguity.

To support these principles, the applicant should look to have some public safety goals. There should be clear line of sight through the organisation as to who is responsible for achieving these goals. These goals should:

- › combine lead and lag indicators;
- › be measurable; and
- › be reported on.

Together the principles and goals should help drive behaviours that ensure public safety.

Safety Critical Systems and Safety Assessment

The applicant's ability to carry out an activity without compromising the safety of the public is paramount – planning for public safety needs to be integrated into business planning.

Personnel and Resources

Having the right people with the right capabilities and tools is critical to achieving good public safety outcomes. Applicants should clearly demonstrate that they understand the resources required to ensure public safety objectives are not compromised. To demonstrate that public safety outcomes are able to be achieved, applicants must show that they understand:

- › what tasks must be performed throughout the operations to ensure public safety;
- › what resources are required to perform those tasks;
- › the level of expertise required to perform those tasks;
- › who is responsible for ensuring that tasks are performed and that they are suitably qualified to do so;
- › how training and competency is managed effectively throughout the operation;
- › how requirements are communicated; and
- › how you can or will recover, in the event something does go wrong, to prevent something from becoming more serious.

If contractors are being used, the applicant must have suitable systems in place to communicate with them and ensure that any public safety risk is well managed.

Identification and Management of Risks

There should be a strong focus on managing the risks (rather than a focus on what the activities are) and an emphasis on prevention rather than reaction. Applicants must demonstrate that they understand the hazards and risks throughout the operations and how these could threaten public safety. The management systems should be built in such a way that these risks can be controlled.

Applicants should focus on managing the risks that have major or significant consequences even if they would be infrequent. The management of the public safety risk will need to be proportionate to the scale of that risk i.e. risks with significant public safety consequences will require more effort and resources to determine the best way to eliminate the risk, or where not practicable to eliminate, to minimise the risk. Applicants should:

- › consider all possible options to control a risk;
- › select the most effective control that is reasonably practicable to implement.

In selecting what control is reasonable, applicants should give consideration to:

- › the likelihood of a public safety risk being realised; and
- › the consequence of the public safety risk being realised; and
- › what is known, or what ought reasonably be known, about the risk; and
- › what is known, or what ought reasonably be known, about how the risk can be controlled.

Applicants must be able to demonstrate an identification of any public safety risks outlining:

- › the likelihood and consequence of the public safety risk;
- › the control measures considered and used to eliminate or minimise the risks;
- › the monitoring activities that will be undertaken to ensure your controls remain effective; and
- › who is responsible for ensuring that controls are implemented.

MBIE encourages applicants to check, consider and use where appropriate to the operation any commonly accepted control measures (such as industry standards) to control the risks. Applicants should still ensure that any residual risk is managed appropriately. Where a decision is made not to implement a control that could improve public safety, (if required) applicants must be able to demonstrate the rationale for not implementing it.

Some risks that the public could be exposed to may require them to be managed in accordance with more prescriptive regulations (hazardous substances might be an example). Applicants must be aware of, and apply these as required.

Figure 2 represents an accepted framework for safety risk management. The complexity of the risk assessment methodology that is used to assess a public safety risk will depend on the nature of the task being performed or the public safety needs to be managed.

To give the regulator confidence that applicants understand the public safety risks they create, a copy of your public safety risk assessment should be provided when the safety case is submitted.

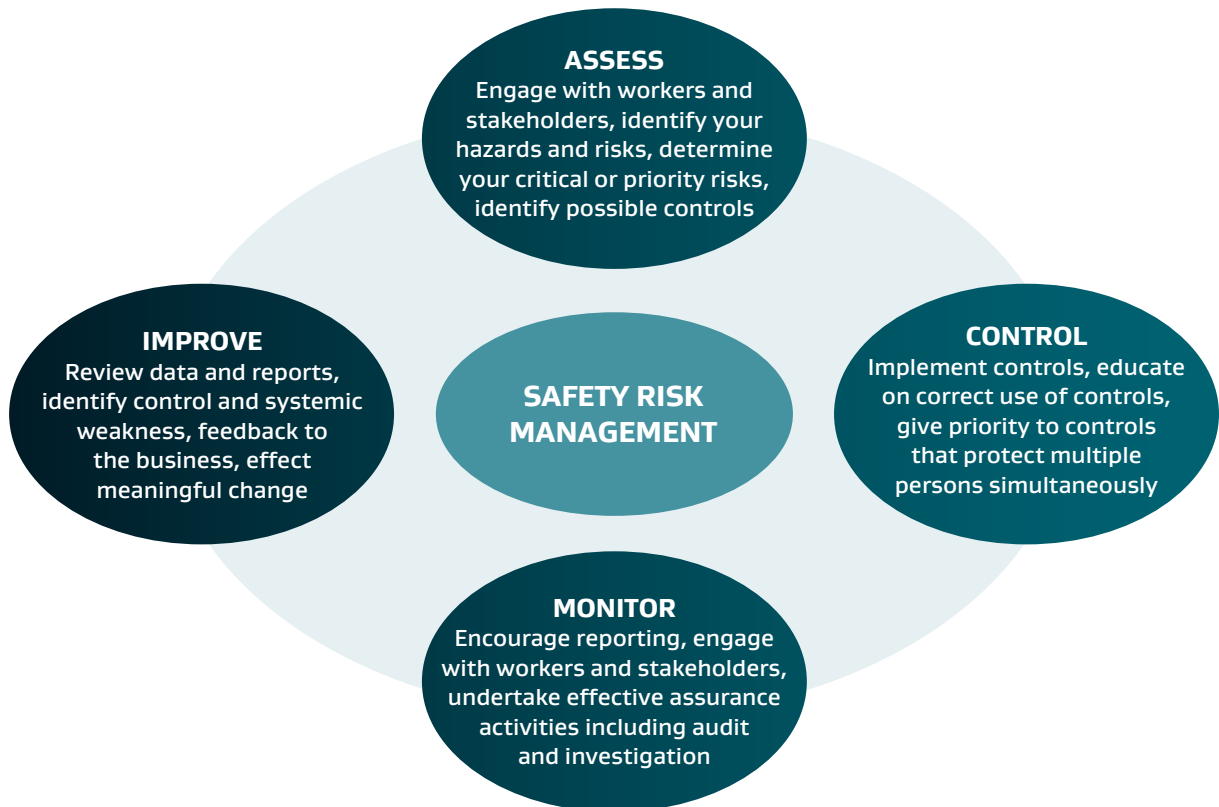


Figure 2: Safety Risk Management

Verification of Safety Systems – Assurance

To ensure that operators keep the public safe, effective monitoring and assurance activity is essential. While mistakes are inevitable lessons must be learnt to avoid any problems from continuing and/or escalating. Operators need to know that the controls they have in place are functioning as intended, and be able to identify emerging risks early.

An effective fit-for-purpose assurance system may give consideration to:

- › incident/accident reporting and notification;
- › internal audits;
- › investigations;
- › safety system assessments;
- › quality assurance; and
- › the ability and means to analyse data².

An applicants safety case should demonstrate that the regulated party:

- › has the appropriate monitoring systems in place for the nature of the operation;
- › has identified who is responsible for monitoring, that they are suitably qualified, empowered and well resourced;
- › knows how the monitoring activities will be working and understand the safety critical nature of each component;
- › the scope of the assurance activities covers the breadth of the operation and will draw together information from various sources; and
- › can collate, analyse, report and act upon the results to ensure the safety of the public – that any problems won't be hidden and/or ignored.

Useful supporting evidence that could be provided in support of the safety case submission can include audit and assurance plans, details of incident and accident reporting systems, a 'Just Culture' policy, audit and investigation frameworks etc.

Emergency Management Planning

The emergency management plan must be specific to the operation and cover the full range of activities that could result in an emergency. It needs to be:

- › carefully considered;
- › tested;
- › communicated;
- › implemented; and
- › reviewed and improved.

To demonstrate that the emergency plan is fit for purpose applicants will need to demonstrate that they have:

- › consulted with emergency services, key stakeholders and neighbouring operations that may be affected, and the public;
- › appropriate first response capability, equipment and training for staff who will be immediately exposed;
- › considered and applied any relevant regulations, standards or codes;
- › considered how they will maintain effective equipment and ensure competency of personnel required to respond; and
- › identified potential emergency scenarios and that the response will be appropriate, regularly tested through rehearsals and any lessons learned will feedback and improve the plan².

² This is not an exhaustive list of assurance activities. Each operation will need to demonstrate a consideration of assurance activity that is suitable to their unique circumstances.

Varying the Safety Case

An effective safety case will give operators the ability to manage the public safety risks they create without the constant need to seek authorisation from the Minister to make changes. It is for this reason that the safety case should be presented as a robust argument rather than a summary of the safety system (any changes to the safety system should not automatically result in a requirement to amend the safety case).

Satisfying the Minister of Changes

There may on occasion be a need to amend the safety case. Operators should consult MBIE to determine whether or not a variation may be required. Operators may do so at any stage, however **must not** implement any proposed variations to the safety case until the Minister is satisfied that they have considered the risk to public safety resulting from those changes and that sufficient assurance has been provided that public safety risks can be managed.

Any variation to the safety case must be applied for in writing, with the amendments clearly identified, the rationale for the changes explained and a suitable risk assessment completed.

Examples of when operators might need to apply for a variation to the safety case include:

- › the nature of activities have changed in such a way that the risk to public safety has increased and the resources or systems for managing the risk are no longer appropriate;
- › the methodology and systems for managing risk are no longer appropriate and the new methodology and systems required are not adequately reflected in the safety case; and/or
- › a variation is required to ensure compliance with your public safety duties and the requirements of the Act and its regulations.

Operators do not need to apply for a variation where minor administrative corrections (such as grammar, spelling or punctuation) are made, however they should ensure that MBIE is provided with the current version of the safety case. Applicants should have a suitable document control system in place to ensure that obsolete material is appropriately removed from service, and that only current material is being operationally implemented.

Formatting and Structure

Applicants should ensure that the safety case is legible, set out in a clear and logical manner and is easily understood (written in plain English). It should be submitted to MBIE in an electronic format (either MS Word or searchable .pdf document).

The commitment to public safety must be evident. The size and complexity of the document will be dependent on the type of operations are undertaken and the public safety risks that operations present.

The Minister may seek to verify the commitments made in the safety case by evidencing components of the safety management system.

Contact Details

Any questions please contact the New Zealand Space Agency directly.

Freephone (within New Zealand)

0508 843 697 (THENZSPACEAGENCY)

0800 843 697 (THENZSPACEAGENCY)

For overseas callers

+64 9 952 1663

Email nzspaceagency@mbie.govt.nz

Website www.mbie.govt.nz/space

