

Regulatory Impact Statement

A Risk-Based Approach to Aviation Safety Regulation

Agency Disclosure Statement

1. This Regulatory Impact Statement was prepared by the Ministry of Transport with assistance from the Civil Aviation Authority (CAA). It provides an analysis of options to implement a risk-based approach to aviation safety regulation to ensure that New Zealand complies with its international obligations and has an aviation safety regulatory system that reflects best practice.
2. A number of factors make it difficult to quantify the costs for certificated commercial aviation participants to implement risk management systems. These include a participant's current compliance with Civil Aviation Rule safety requirements, size and complexity of its operation, and proactivity in adopting a risk management system. As such, the costs outlined in the case studies used in this analysis are indicative only. However, aviation participants who are fully compliant with existing regulations (the Civil Aviation Act 1990, the Civil Aviation Rules, and the Health and Safety in Employment Act 1992) should experience few additional costs.
3. It is expected that participants will initially experience additional certification costs to participate in the civil aviation system as a result of additional time required for the CAA to perform certification inspections. These certification costs will be in addition to the implementation costs outlined in the case studies. The CAA is currently determining how a certification for a risk management system would be undertaken, and what additional time may be required to undertake certification. This Regulatory Impact Statement includes an estimate of the additional hours required to certify a Part 135 (Helicopters and small aeroplanes) operator under a risk-based approach to aviation safety regulation. This estimate has been included to illustrate the potential additional costs; estimates for other Rule Parts have not been included.
4. Actual and potential benefits that have been identified include improved safety, reductions in equipment damage from accidents or incidents and the associated repair/replacement costs, savings on insurance premiums, and the potential for reduced regulatory oversight where sufficient assurance is provided. These benefits may off-set some of the costs faced by individual participants to implement a risk management system.

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Status quo

New Zealand's regulatory environment

1. Civil aviation in New Zealand is regulated through the Civil Aviation Act 1990 and a suite of Civil Aviation Rules. The CAA develops, maintains and enforces minimum aviation safety and security standards through the Rules.
2. Many participants in the New Zealand aviation system are required to have Quality Management Systems in place. A Quality Management System uses internal quality assurance procedures to identify and correct instances of non-conformance or non-compliance. A Quality Management System focuses on the delivery of efficient functional processes; however, it will not ensure that an organisation is identifying and eliminating (where possible) all safety risks.
3. The CAA is also the designated authority to administer the provisions of the Health and Safety in Employment Act 1992 (HSE Act) in respect of the aviation sector, specifically for aircraft while in operation. This allows the CAA to also make use of the regulatory tools provided in that Act to contribute to ensuring safety.

The global move to a risk-based approach to regulation

4. New Zealand's regulatory environment, described above, is heavily influenced by the Convention on International Civil Aviation 1944 (the Convention). New Zealand is a signatory to the Convention¹ which obliges New Zealand to secure, to the highest practicable degree, compliance with aviation global standards as established by the International Civil Aviation Organization (ICAO).² The strength and effectiveness of the international system relies on the setting of, and adherence to, these global standards.
5. In 2010, ICAO adopted a risk-based approach to overseeing member states' compliance with ICAO standards in recognition of the limitations associated with the existing complex, technical rule-based compliance system.³
6. In April 2013, ICAO re-affirmed this approach by adopting a new annex (Annex 19) to the Convention, consolidating and refreshing its risk-based Standards and Recommended Practices. ICAO expects states and aviation participants to follow the risk-based approach outlined in Annex 19 to ensure aviation safety, resulting in a system that proactively addresses systemic risks. Two of the main ICAO requirements include:
 - member states are obliged to develop a State Safety Programme (SSP), outlining the regulations and activities implemented by the state to manage aviation safety

¹ Section 14 of the Civil Aviation Act requires that the Minister "ensure that New Zealand's obligations under international civil aviation agreements are implemented." Section 33(1) requires that Rules made by the Minister of Transport are not inconsistent with ICAO standards.

² Article 38 of the Convention obliges New Zealand to notify ICAO where New Zealand has different minimum standards for international operations from those set in the Standards and Recommended Practices. These differences are published by ICAO and made available to other member states.

³ The 37th Session of the ICAO Assembly adopted a resolution to evolve the Universal Safety Oversight Audit Programme (USOAP) towards a risk-based 'continuous monitoring approach' (CMA). The systematic and more proactive conduct of monitoring activities under USOAP CMA is designed to make a more effective and efficient use of ICAO resources and reduce the burden on States caused by repetitive audits. USOAP CMA was launched in January 2013.

- Safety Management Systems (SMS) is the risk management system required by ICAO to be implemented by aviation operators.
7. In accordance with the ICAO obligations, the CAA is shifting towards a risk-based regulatory approach to ensure safety. This includes CAA staff training to take a more targeted, proactive approach to identify and address risks in certificated aviation operations, even where these are not addressed in the Civil Aviation Rules. The result of this is a change to focus surveillance and auditing on a set of higher risk areas for the participant rather than solely checking compliance against all relevant Rules.

Problem definition

Non-compliance with international obligations

8. In 2006, the CAA was audited by ICAO and issued with two adverse findings due to non-alignment with SMS requirements for international operations, in effect noting that New Zealand had yet to meet international standards in this area.
9. Complying with the ICAO Standards would reduce the potential risk of damage to New Zealand's international reputation. International trade and tourism in New Zealand may be adversely affected where other countries lack confidence in the safety of our aviation system.
10. For example, the United States Federal Aviation Administration (FAA) has been clear that if a State is not compliant with ICAO Standards that it sees as being necessary it will not allow that State's operators to enter United States airspace.⁴ This has been demonstrated by the recent decision by the FAA to downgrade India's safety ranking, freezing the capacity of Indian airlines flying to the United States until identified safety deficiencies are addressed. While this is an extreme example, it demonstrates the potential international impact of a damaged aviation safety reputation.
11. Key trading partners such as Canada, the United Kingdom (UK), Australia, and Singapore have already implemented a risk-based approach to aviation safety regulation. New Zealand risks becoming out of step with international best practice in an industry that relies on adherence to global standards.

A growing aviation sector and the impact on safety

12. Aviation plays a vital role in New Zealand's economic wellbeing, and the sector is growing rapidly.⁵ The quantity and diversity of aviation operations is predicted to expand over the short and long term, in line with global trends. In New Zealand, international aircraft movements have increased by 90 percent compared to 1996 levels. Domestic aircraft movements recorded by Airways Corporation have remained relatively stable, currently 2.9 percent below 1996 levels.⁶

⁴ *International Aviation Safety Assessments (IASA) Programme*, Federal Aviation Administration, 2013. Available: <http://www.faa.gov/about/initiatives/iasa/>

⁵ In 2009, aviation-related revenues were estimated to be almost \$10 billion, \$5.9 billion of which was from domestic activity. This was expected to grow to almost \$15 billion by 2015. The direct and indirect impacts of the New Zealand aviation industry were calculated at 6.9 percent of GDP in the year to December 2009. Air passenger transport also contributed approximately \$4.3 billion (18 percent) to New Zealand's \$23.9 billion tourism revenue in the year to March 2013. *New Horizons: A report on New Zealand's Aviation Industry*. Prepared for New Zealand Trade and Enterprise by Knotridge Ltd, 2010.

⁶ *Domestic and International Aircraft Movements by Calendar Year*, Airways Corporation, 2013.

13. Our aviation system is one of the safest in the world but accidents and serious incidents continue to occur. Airline operations⁷ in New Zealand have the lowest accident rate when compared to all other aviation sectors in New Zealand.⁸ Many of these airline operators, including Air New Zealand, have already implemented risk management systems, such as SMS, voluntarily.⁹
14. In some aviation sub-sectors with a large number of small domestic operators (such as agricultural aviation operations), the accident rate is not trending down as quickly as desired, is stalling or is showing signs of reversal. Research indicates that for agricultural operations risks are often not identified, resulting in safety failures.¹⁰
15. Global trends and experience indicate that safety performance is reaching a plateau in improvement and that a different, more proactive approach to identify and address safety risks is needed. ICAO has identified that further safety gains under the traditional rule and compliance system alone will be increasingly difficult to achieve.¹¹
16. This suggests that New Zealand will struggle to achieve further safety gains under the current regulatory system which is based on rules which set minimum standards, quality management systems and CAA audits focussed on compliance with the minimum standards.
17. If accident rates are not reduced, the expected increase in aviation activity will see an increase in the number of air accidents. A more proactive approach to identify and address safety risks, through the implementation of risk management systems, is warranted.

Objectives

18. The overarching objective of the proposal is to improve the safety of air operations in New Zealand by ensuring that the risks posed by aviation are lowered in a way that minimises business compliance and government administration costs, and ensures that New Zealand complies with international obligations.

Options and impact analysis

19. To improve safety in the context of a growing and increasingly diverse aviation system, four options were considered.¹²
 - A. **Continuation of the status quo** – no changes to the current system of Civil Aviation Rules and compliance.
 - B. **Increased inspections, audits and enforcement** – extra resources dedicated to more frequent surveillance and audit of aviation participants to ensure compliance with the Rules.

⁷ Airline operations refer to commercial transport operations including helicopters, and small, medium and large aeroplanes.

⁸ *Aviation Industry Safety Summary: 1 July 2012-30 June 2013*, Civil Aviation Authority, 2013.

⁹ Some key players in the industry (Air New Zealand, Airways Corporation, Vincent Aviation) have already formally implemented risk management practices to conform to international best practice, recognising the safety benefits a risk management framework provides.

¹⁰ *Agricultural Aviation Sector Risk Profile*, Civil Aviation Authority, September 2013.

¹¹ *Safety Management Manual (SMM)*, Second Edition, Doc 9859 AN/474, International Civil Aviation Organization, 2009, Part 2.3.

¹² These options are described in more detail in the Civil Aviation Authority consultation document *Safety Regulation of Aviation, Considering a Risk Management Approach*, 28 May 2013. Available: http://www.caa.govt.nz/SMS/rbr_consult.pdf.

- C. **Voluntary implementation of risk management systems** – the CAA would encourage operators to voluntarily implement risk management systems. The CAA would continue to regulate safety with standardised Rules and quality checks, but would make more use of risk analysis to deliver these functions.
- D. **Mandatory implementation of risk management systems** – aviation participants would be required, via the Civil Aviation Rules, to implement a risk management system, such as SMS. The CAA would shift its focus to a risk analysis approach to surveillance and auditing roles, and prioritising regulatory interventions in the aviation system.

20. Each of the above options was assessed according to the following criteria:

- Does the option improve safety performance?
- Is it international best practice and does it meet ICAO Standards?
- Will there be start-up costs for aviation businesses?¹³
- Will it be flexible and durable, enabling aviation innovation?
- Will it increase efficiency in the use of CAA resources?
- Does it allow scalability for different sized organisations?
- Does it offer ease of implementation?
- Does it provide shared accountability as envisaged by the Civil Aviation Act 1990?
- Does it assist operators to meet their obligations under other regulatory frameworks, such as health and safety?

21. Table 1 below sets out how each option has been rated against the above criteria. This table was included in the CAA consultation document *Safety Regulation of Aviation, Considering a Risk Management Approach*, but has been amended following further consideration of the scoring criteria.

Table 1 – Assessment of options for improving aviation safety

Criteria	Weighting	Option A (Status Quo)	Option B (Increased oversight)	Option C (Voluntary risk management system)	Option D (Mandatory risk management system)
Does the option improve safety performance?	3	-	✓	✓ ¹⁴	✓
Is it international best practice and does it meet ICAO standards?	2	xx	xx	-	✓✓
Will there be start-up costs for aviation businesses?	2	-	-	-	x
Will it be flexible and durable, enabling aviation innovation?	2	x	x	✓	✓✓
Will it increase efficiency in the use of CAA resources?	2	x	xx	x	✓✓
Does it allow scalability for different sized organisations?	2	✓	-	✓	✓

¹³ The criteria refers to start-up costs, rather than total costs, as once the option has been implemented the main cost for operators will be for CAA certification, which will be the same hourly charge for all operators.

¹⁴ There is no guarantee that all aviation participants would voluntarily adopt risk management. Widespread non-adoption would undermine any benefits that proactive compliance could bring.

Does it offer ease of implementation?	1	✓✓	x	✓	✓
Does it provide shared accountability as envisaged by the Civil Aviation Act 1990?	1	-	xx	✓	✓✓
Does it assist operators to meet their obligations under other regulatory frameworks, such as health and safety?	1	-	-	✓	✓
Total		-4	-10	8	19

- ✓✓ = 2 points; criterion strongly supports this solution.
- ✓ = 1 point; criterion supports this solution.
- = 0 points; criterion has negligible/neutral impact or is not applicable.
- x = -1 point; criterion would not support this solution.
- xx = -2 points; criterion definitely would not support this solution.

22. Option D, mandatory implementation of risk management systems, best meets the objectives and criteria outlined above, and is the recommended option. Ensuring an efficient, risk-based system is best achieved by making risk management systems mandatory for all certificated participants.

Features of the preferred option

23. The preferred option includes the following main features.

- A new Civil Aviation Rule Part would be created requiring certificated aviation participants to implement a risk management system, such as a SMS.¹⁵
- An operator’s risk management system would need to be approved by the Director.
- The CAA would audit an operator’s risk management system to ensure risks are being appropriately identified and mitigated.
- Non-certificated participants, such as private recreational microlight aircraft flyers, would not be required to establish risk management systems. The CAA would still, however, adopt a risk-based regulatory approach towards them. This would involve spot checks to ensure operators are compliant with relevant operating rules (e.g. Part 91 for general operating and flight rules, and Part 61 for pilot licences and ratings).

Benefits

24. The preferred option of requiring operators to have a risk management system offers a number of benefits that are best realised when the entire system is taking the same approach to safety. These benefits are discussed below.

Safety is improved

25. Requiring operators across the entire aviation system to proactively identify and mitigate risks, and provide safety information to the CAA will reduce the risk of both one-off and potentially systemic safety failures.

¹⁵ A comparison between the requirements contained in the Civil Aviation Rules (such as QMS) and under SMS is contained in Appendix 1. Further guidance on what is required to implement the elements of SMS is included in the CAA’s advisory circular AC00-4, available on the CAA website: http://www.caa.govt.nz/Advisory_Circulars/AC000_4.pdf.

26. From 2008 to 2011, Transport Canada conducted SMS assessments of all of that country's airlines, verifying that SMS is "effective and contributes to a healthier safety culture". Specific to air transport, Transport Canada attributes risk management systems as a key part of a 25 percent decrease in the rate of accidents and as contributing to the lowest number of accidents in 15 years.¹⁶
27. Applying Transport Canada's experience to New Zealand, had a risk management requirement been in place over that same time period, New Zealand's accident rate could possibly have been an average of 4.5 accidents per 100,000 flying hours instead of 6.
28. As mentioned in paragraph 13, airline operations in New Zealand (many of whom have already implemented risk management systems) currently have a very low accident rate. As a result, the airline operations sector may not experience significant further reductions in accident rates with the introduction of mandatory risk management systems. The main safety benefits arising from a change to a risk-based approach to aviation safety regulation will be in non-airline sectors (such as agricultural or adventure aviation operations).
29. A proactive programme of risk management will assist organisations in identifying potential hazards, and subsequently risks, and allow these to be managed before they can impact on the business. The training, awareness and systems developed in a system such as SMS provide the tools to both prepare for and recover from negative safety outcomes, and to develop strategies to defend an organisation against their occurrence in the first place.
30. Operators who are identified by the CAA as having a low quality risk management system will receive more frequent audits, and incur higher costs, than operators with effective risk management systems in place.

Aligns with ICAO standards and international best practice

31. The preferred option will allow New Zealand to fully comply with relevant ICAO standards and be aligned with international best practice in risk management. This may enhance New Zealand's reputation for having a safe aviation system.

Efficient use of CAA resources

32. The requirement for mandatory risk management systems for both international and domestic aviation operations would ensure consistent implementation of global best practice for all certificated operators in the New Zealand aviation system. Using a uniform approach across the New Zealand civil aviation system should also improve the efficiency and effectiveness of the CAA's regulatory oversight, focusing audit resources on participants that are not identifying or mitigating risks as desired.

Alignment with other regulatory frameworks

33. A mandatory risk-based approach to aviation safety regulation is compatible with other domestic regulatory systems that have already adopted, or are in the process of adopting, similar frameworks, such as for environmental protection, workplace health and safety, hazardous substances, and some primary industries. In 2013, the CAA released the *Agricultural Aviation Sector Risk Profile*¹⁷ noting that, under the current system, some operators have difficulty complying with the multiple regulatory

¹⁶ *Air Transport*, Transport Canada, 2012. Available: <http://www.tc.gc.ca/eng/policy/anre-menu-3018.htm>.

¹⁷ *Agricultural Aviation Sector Risk Profile*, Civil Aviation Authority, September 2013.

requirements, creating opportunity for safety failures. An aviation participant's risk management system can be designed to cover all of its legislative requirements in a single framework, simplifying compliance with regulations and potentially reducing duplication of resources.

Business compliance costs are expected to reduce over time¹⁸

34. In 2012, costs from repairs and loss of revenue as a result of accidents and incidents in New Zealand ranged from \$200-\$2,000,000 per occurrence. Through formalised processes and proactive identification of risks, a well developed risk management system could play a significant part to identify and address such risks, providing cost savings from accidents and incidents.
35. Related to a reduction in accidents and incidents, effective risk management also provides potential for reduced costs from wages and other payments made as a result of workplace injuries.
36. International evidence supports the benefits businesses can realise. Australian analysis notes that Singaporean airline operators recognised that significant savings were made by reduced insurance costs and the spin-off benefit of identifying organisational inefficiencies.¹⁹
37. The Australian analysis also summarises the range of benefits for operators identified by Transport Canada and the UK Civil Aviation Authority, following their introduction of SMS requirements.
 - Greater operating efficiencies, such as fewer returns to gate²⁰ and cancellations.
 - Reduced insurance premiums.
 - Tangible savings from the prevention of high-frequency low-consequence operational incidents, such as ground damage or occurrences due to unsafe actions, thus avoiding repair costs.
 - Tangible savings as a result of avoiding low-frequency high-consequence incidents. Assuming that during a ten-year period a company were to have a single accident that resulted in writing-off an aircraft, the cost of replacing that aircraft from new could be, for example, approximately AUD\$250 million for an Airbus A340, AUD\$25 million for a Bombardier Dash 8, and AUD\$200,000 for a Piper PA-31 Navajo Chieftain. For an individual operator, insurance excesses can be greater than the cost of damage, particularly when including indirect costs such as use of a substitute aircraft and loss of ability to provide service (and thus income).
 - Less regulatory presence where the participant effectively manages its own day-to-day activities.

Scalable for different sized organisations

38. One of the key principles of SMS is that no single system fits all organisations. The New Zealand aviation industry is characterised by the wide variety of participant organisations, from large multi-fleet air transport operators, large international airports

¹⁸ The remaining benefits in this section could be achieved under option C (voluntary implementation of risk management systems) or option D (mandatory implementation of risk management systems).

¹⁹ *Regulatory Impact Statement: Safety Management Systems*, Civil Aviation Safety Authority, Australian Government, 2009.

²⁰ A 'return to gate' occurs at an airport when an aircraft has pushed back from the terminal in preparation for take-off, but has to return to the terminal due to an unforeseen issue such as a mechanical problem.

and large-scale maintenance operations, to organisations with just one aircraft, small maintenance operations and small aerodromes. Each organisation has unique features and requirements; risk management plans should be designed to be suitable for the individual organisation.²¹

Flexible, durable and enables innovation

39. A risk-based approach to aviation safety regulation allows for adaptability in complex situations or sudden events, as well as providing flexibility in day-to-day operations. The regulations determine 'what' is to be achieved, but allow the organisation to determine 'how' best it can be done within the rules.

Ease of implementation

40. For many organisations, what they already have in place will exceed the basic risk management system regulatory requirements. For others, the risk management system may be an extension of existing systems, such as the Quality Management Systems, or achieved by formalising practices and processes already in place. An organisation will need to conduct a gap analysis to determine what elements of a risk management system are missing and need to be incorporated.

Costs

41. It is not possible to quantify a total cost to the aviation industry of this proposal based on the available information. The scalable nature of risk management systems means that there are a number of variable factors that would result in participants incurring different costs, including those certificated under the same Civil Aviation Rule Part (such as helicopter operations certificated under Part 135). These include:
- the size, scope and complexity of an organisation
 - the quality of a participant's current Quality Management System
 - a participant's past and current compliance with all relevant regulations
 - the quality of documentation submitted by participants to the CAA
 - the degree of proactive risk management implementation already undertaken
42. Table 2 below outlines approximate full-time equivalent (FTE) resource requirements and costs (such as costs for training and software) for implementation and the first full year of a risk management system for a cross-section of certificated operators compliant with existing requirements. The estimated costs and resource requirements in the table are based on analysis of five hypothetical organisations that represent different Rule parts. The characteristics of the hypothetical organisations used for the analysis (such as number of staff/aircraft and current compliance with safety requirements) are described in Appendix 2.

²¹ The CAA advisory circular, AC00-4, provides guidance on the differing requirements for organizations, based on criteria such as number of aircraft, number of staff and the nature and complexity of operations.

Table 2 – Estimated implementation and ongoing costs of SMS²²

Operator	Implementation (one-off)		Ongoing maintenance and enhancement (first full year)	
	Resource requirement	Cost	Resource requirement	Cost
Part 125: medium aeroplanes	0.2 FTE	\$6,000	0.17 FTE	\$4,500
Part 135: helicopters and small aeroplanes	0.13 FTE	\$6,000	0.10 FTE	\$4,500
Part 137: agricultural aircraft operations²³	0.10 FTE	\$3,000	0.08 FTE	\$1,500
Part 139: aerodromes	0.15 FTE	\$6,000	0.10 FTE	\$4,500
Part 145: aircraft maintenance organisations	0.2 FTE	\$6,000	0.17 FTE	\$4,500

43. As an example, the \$6,000 implementation cost for a Part 135 (helicopters and small aeroplanes) operator is based on a company that undertakes helicopter sightseeing and charter flights from one base of operations on the South Island. The company has three helicopters, between four and eight pilots (depending on workload) and four other full-time staff. There is also a part-time contractor that acts as Quality Manager. Depending on the factors listed in paragraph 41 above, different operators certificated under the same Rule Part may have higher or lower costs than those estimated in the table.
44. For many participants, a risk management system may be achieved by formalising practices and processes already in place, minimising any new costs. For some, there may be implementation costs, such as creating a safety policy and training staff. Ongoing costs may include staff training, maintaining reporting and data analysis systems, and implementing new systems to reduce risks if these are not already in place.
45. The amount of time required to implement a risk management system is linked to the size and complexity of the organisation (i.e. larger organisations with multiple bases of operation would require more time to implement). However, larger organisations are also more likely to have existing dedicated resources, such as a full-time Quality Manager, that could be appointed as a Safety Manager to facilitate all risk management activities. In practice, the FTE amount indicated would be split between different personnel and the costs incurred would be spread across the entire transition period/year of operation.

²² Excluding CAA fees and charges, as described in paragraph 47.

²³ Part 137 (agricultural aircraft operations) participants do not currently have a requirement to implement Quality Management Systems. The CAA had previously determined that, for the costs imposed on Part 137 operators, Quality Management Systems would not satisfactorily improve the behavioural safety risks in the agricultural aviation sector. Consequently, these participants may incur additional costs to fully implement risk management systems compared to those operators that already have a Quality Management System in place. This additional cost for Part 137 operators is accounted for in Table 2. The estimated costs for Part 137 operators included in the table are lower than for other operators as these agricultural operations are usually very small.

46. Compared to the status quo, some participants assessed by the CAA as having a well developed and implemented risk management system could see reduced costs associated with CAA certification and auditing.
47. If risk management systems were required, participants could anticipate increased certification costs in addition to the costs outlined in Table 2 above. As an example, the CAA estimates that Part 135 (helicopters and small aeroplanes) operators may require approximately 20 additional hours for certification at \$5,680.²⁴ Certification costs could be reduced over time as the CAA becomes more assured of the participant's risk management system. It is important to note that, due to the similarity of a risk-based approach with existing requirements, additional approximate costs are likely to include a number of the elements currently assessed by the CAA (refer to Appendix 1) therefore, actual new costs could be lower for many operators.

Consultation

48. The CAA consulted on the four options outlined in this Regulatory Impact Statement in a discussion document from 28 May to 8 July 2013. Invitations to comment were distributed to all 436 certificated aviation participants and 30 aviation industry representative associations. This proposal was also discussed at SMS forums organised by the CAA, held across the country from 10 to 13 June 2013. These forums were attended by over 300 people. The discussion document was made available on the CAA's website and notified to the industry in the *Vector* magazine, which is circulated to nearly 16,000 recipients. A total of 48 written submissions were received. Feedback was also received verbally at the SMS forums.²⁵
49. Consultation confirmed that the majority of respondents (68.7 percent) are supportive of a move to a risk-based approach to aviation safety regulation, and did not identify any unknown significant issues. Feedback also identified that there is a desire from operators for New Zealand safety regulation to be consistent across the entire system, to reflect global best practice and to be in line with international requirements.
50. A small minority of respondents (16.6 percent) did not support the proposal.²⁶ Two main concerns were raised.

Concern	Response
Implementation costs, particularly for small operators.	The scalable and flexible nature of risk-based regulation could allow costs to be minimised for small operators. Costs will vary depending on the size and complexity of an organisation and its current compliance with other regulatory regimes such as Health and Safety in Employment legislation. It is expected that small operators with good safety processes already in place, should not face significant costs. The CAA would also provide support to organisations to implement risk management systems, such as with seminars and printed resources.
The capability of the CAA to implement the system.	The CAA has implemented a comprehensive internal change programme to build capacity and capability.

²⁴ This estimate is based on the hourly charge increase that takes effect on 1 July 2014.

²⁵ A summary of submissions can be found on the CAA website at http://www.caa.govt.nz/SMS/SMS_Consultation_Feedback.pdf.

²⁶ Approximately 14.6 percent of respondents did not comment on whether they supported the proposal or not.

51. Only three respondents provided specific cost estimates for implementing a risk management system. One of these respondents noted costs in the order of \$15,000 for setting up a risk management system; however, this estimate was provided by a recreational organisation that does not currently require an operating certificate, and would not be required to implement a risk management system under the preferred approach. The second respondent cited formal training costs, like a diploma qualification, of \$8,000 per person for training (excluding usual employee wages that may be paid during training leave). Training requirements will vary depending on the size and complexity of the organisation; formal qualifications in safety auditing and investigation may be required for a safety manager or safety specialists in a large organisation, but may not be required for small organisations. The third respondent estimated implementation costs for a small unmanned aircraft operation at about \$1,000.

Conclusion and recommendations

52. Maintaining the status quo (Option A) would limit the potential for improvement to aviation safety in New Zealand and would continue New Zealand's non-compliance with ICAO Standards and Recommended Practices. This approach would also share the inefficiencies and gaps in safety that would be present in a voluntary system (Option C) where some participants choose not to implement identified best practice. The other option of increasing inspections and audits (Option B) would shift the responsibility for safety further to the CAA and would require an increase in resourcing to carry out its functions.
53. The aviation sector must be treated as a system, complete with interdependent parts, to obtain the best possible value, efficiency and improvements in safety. Making risk management systems mandatory for all certificated participants best achieves this.
54. The preferred option (Option D) to mandate participants' implementation of a risk management system presents the best option to meet the objectives stated in paragraph 18. This would improve safety outcomes for operators and the travelling public in a cost effective way, and maintain and enhance New Zealand's international reputation.

Implementation plan

55. A new Rule Part will be developed to require commercial participants to operate a risk management system. Development of the new Rule would follow the usual Notice of Proposed Rule Making (NPRM) process, providing stakeholders further opportunity to comment on the Rule content.
56. The implementation of the new Rule Part would address the adverse findings recorded by ICAO and would ensure that New Zealand is compliant with ICAO SMS standards.
57. It is currently proposed that the implementation of Rule changes would commence over two phases to assist in the transition of the entire system. This method of implementation would provide small operators (such as aviation recreation organisations, agricultural aircraft operations, and adventure aviation operations) with additional time to prepare for implementation of the Rule requirements. While implementation details are still being finalised by the CAA and would be subject to further consultation, the approach currently being considered is described in Table 3 below.

Table 3 – Proposed implementation of SMS requirements

	Phase 1	Phase 2
Participants included in Rule change	<ul style="list-style-type: none"> • Part 119 (Air Operators) - including Part 135 operators (helicopters and small aeroplanes) with an airline operators certificate • Part 139 (Aerodromes) • Part 145 (Aircraft Maintenance Organisations) for airline maintenance organisations • Part 172 (Air Traffic Service Organisations) 	<ul style="list-style-type: none"> • Part 19F (Supply Organisations) • Part 115 (Adventure Aviation) • Part 135 operators with a Part 119 General Aviation Air operator's certificate • Part 141 (Training Organisations) • Part 137 (Agricultural Aircraft Operations) • Part 145 for non-airline maintenance organisations • Part 146 (Aircraft Design Organisations) • Part 148 (Aircraft Manufacturing Organisations) • Part 149 (Aviation Recreation Organisations) • Part 171 (Aeronautical Telecom Services) • Part 173 (Instrument Flight Procedure Services) • Part 174 (Aviation Meteorological Services) • Part 175 (Aeronautical Information Services)
Time to implement	1 year from date Rule takes effect	2 years from date Rule takes effect

58. New entrants to the aviation system would be required to have a risk management system as part of their initial entry application.
59. The SMS Advisory Circular developed by the CAA provides detailed guidance on what the CAA would consider as an acceptable risk management system and covers all relevant Rules.
60. The NPRM consultation on a Rule implementing a risk-based approach to aviation safety regulation would provide opportunity for participants to comment on how long may be required to implement a risk management system, and provide more detail on estimated costs. The CAA would consider any comments and continue working with participants to facilitate their implementation of a risk management system.
61. CAA staff have and will continue to receive risk management training to ensure they have the requisite capability to undertake a risk-based approach to aviation safety regulation. The CAA has developed a draft risk-based implementation plan. This is an internal document that provides the CAA with a comprehensive change management plan, including training, workshops, resource development, sector risk profiling and changes to business technology systems.

Monitoring, evaluation and review

62. If this proposal is approved, a risk-based approach to regulation would become business as usual for the CAA. The CAA would undertake a number of initiatives, as outlined below, to measure the effectiveness of implementation of a risk management system, based on how well the system meets its objectives.

Improve safety of air operations

63. Improving aviation safety is a key objective for implementing a risk-based approach to aviation safety regulation. To monitor the effectiveness of risk management systems at improving safety, the CAA will:

- monitor the number of participants with certified risk management documentation and processes
- analyse the findings of CAA audits to identify trends over time e.g. general improvement in organisations' safety performance, common areas of risk in specific sectors of the industry
- review activities of CAA safety initiatives
- develop and implement performance indicators for CAA and aviation participants. Safety performance indicators will vary depending on the type of organisation; however, some indicators are common to all aviation organizations, such as:
 - i. *reactive* indicators such as the number of major findings in audits
 - ii. *proactive* indicators such as the proportion of staff that have completed risk management training
 - iii. *interactive* indicators such as completion of employee surveys

64. The insights gained from this information will allow the interventions that make up the CAA's risk-based approach to regulation to be adjusted accordingly.

Minimise business compliance and government administration costs

65. The CAA will also monitor the impact of the move to a risk-based approach to aviation safety regulation on business compliance costs and government administration costs. This will primarily be completed by reviewing how much revenue is generated through levies, fees and charges from operators²⁷, compared to the expenditure required to maintain the administration of the new approach. These figures may be compared with the same figures from before the implementation of mandatory risk management systems to determine the impact of the new approach. Monitoring of progress and outcomes would be achieved through the CAA's Statement of Intent and Annual Report process.

²⁷ The CAA sets levies, fees and charges to recover its costs for providing services. These services include: certification and licensing of aviation participants; monitoring of compliance with civil aviation and security standards; investigation and enforcement of civil aviation rules; publication of aeronautical information; safety education and promotion; safety information and analysis.

Appendix 1

Elements of Safety Management Systems

1. The table below provides a basic comparison of existing safety requirements of most aviation participants and what would be required under a risk-based approach (SMS). It shows that only two key elements (highlighted) would be completely new requirements, and that the effort and costs involved for participants would relate primarily to integrating the different management systems into one and, subsequently, the associated costs of CAA certification of that updated system.
2. Further guidance on what is required to implement the elements of SMS is included in the CAA's advisory circular AC00-4, available on the CAA website.

Civil Aviation Rules ²⁸	Safety Management Systems	Health and Safety in Employment Act 1992
Safety policy	Safety policy and accountability	Duties of persons who control places of work (section 16)
Emergency response plan	Coordinated emergency response planning	Information for employees on what to do if an emergency arises (section 12(1)(a))
Document control process	Development, control and maintenance of safety management documentation	Recording and notification of accidents and serious harm (section 25)
	Hazard identification	Identification of hazards (section 7)
	Risk management ²⁹	
Safety investigation	Safety investigation	Identification of hazards (section 7(2))
Process to monitor and measure compliance-based performance	Monitoring and measuring performance	
	Management of change ³⁰	

²⁸ These current Rule requirements are distributed among various Rule Parts, depending on the type of operator. For example, a safety policy is required for an Adventure Aviation operator under Rule Part 115 (Adventure Aviation, initial issue – Certification and Operations); a safety policy is required for a helicopter operation under Part 119 (Air Operator – Certification).

²⁹ Risk management involves developing and implementing a systematic way to identify, assess and control safety-related risks. This could include appointing a dedicated person to be responsible for risk management processes, educating and training staff in risk management, and documenting current and emerging risks (a risk register) and risk management procedures.

³⁰ Management of change involves organisations recognising upcoming changes (such as purchasing new aircraft), conducting risk assessments to consider the risks associated with the change, and

Continual improvement process	Continual improvement of the Safety Management System	
Internal compliance and audit programme	Internal audit programme	
Management review process	Management review process	
	Safety training and education programme	<p>Training and supervision (section 13)</p> <p>Development of employee participation system (section 19C(4))</p> <p>Training of health and safety representatives (section 19E)</p>
	Communication of safety critical information	<p>Employees to be given results of monitoring (section 11)</p> <p>Information for employees generally and health and safety representatives (section 12)</p> <p>General duties to involve employees in health and safety matters (section 19B)</p>

determining whether any measures need to be implemented (or processes modified) to manage the change. Any procedures used by an organisation to manage change should be recorded.

Appendix 2

Case studies used to estimate implementation costs

1. This appendix describes the five case studies used to estimate costs and savings associated with the implementation of a risk management system (such as SMS) for a cross-section of aviation certificate holders. The estimated costs, based on these case studies, are summarised in Table 2 of the Regulatory Impact Statement.
2. These case studies include four aviation organisations that would be among the first required to implement a risk management system (including Part 125, Part 135, Part 139 and Part 145). Also included is one of the small operators (Part 137) not currently required to have a Quality Management System.³¹
3. These case studies are hypothetical, but have been loosely based on aviation organisations in New Zealand in order to maintain context.
4. The table below describes the operational nature of the hypothetical organisations used in the analysis.

Part 125 certificate: medium aeroplane operator	<p>This organisation operates two Beechcraft 1900 aircraft (for regional scheduled services), and two Cessna C208 Caravans (predominantly for scenic flights). They have four different bases; two on the North Island, and two on the South Island (with their main base on the South Island), and outsource their maintenance. They have between 10-20 crew working for them (depending on the season), and a full time staff of nine. The company is run by a Chief Executive who is the owner, with a Chief Financial Officer, Chief Pilot, Quality Manager (full time) and other supporting staff.</p> <p>As a result of holding a Part 119 / 125 Certificate, they have a compliant Internal Quality Assurance Programme in place, as well as the systems and processes required to meet their HSE obligations.</p>
Part 135 certificate: air operator (helicopter)	<p>This organisation operates three helicopters; two Robinson R44's and a Bell JetRanger 206B out of one base in the South Island. They conduct a range of different services including tourism / sightseeing flights, charter operations, and (under Part 137 Certificate) agricultural operations. The organisation also holds a Part 145 Certificate to conduct their own maintenance. They have between 4 and 8 pilots working from them (depending on workload), a full time staff of 4 people (including the Chief Executive, one administration staff member and two full-time maintenance engineers). The Quality Manager is part time (contracted in).</p> <p>As a result of holding Part 135 and Part 145 Certificates, they have a compliant Internal Quality Assurance Programme in place, as well as the systems and processes required to meet their HSE obligations.</p>
Part 137 certificate: agricultural aircraft operator	<p>This organisation has two aircraft, Fletcher FU24s, which are used exclusively for agricultural operations on the North Island. The owner of the organisation is also one of the two pilots, and they work with one person who undertakes administrative work / booking of jobs. A loader driver also contracts his services to the operator. Maintenance is undertaken by a third party.</p> <p>As a result of only holding a Part 137 Certificate, the organisation is not required to have a Quality Management System, but has sufficient systems in place to be compliant with the HSE Act.</p>
Part 139 certificate: aerodrome operator	<p>This airport is in the South Island in a relatively well-populated area, with a mixture of regular scheduled services by Regional carriers, charter and sightseeing operations (both aeroplanes and helicopters). It occasionally may service a passenger jet if diversions for a nearby airport are required. Both day</p>

³¹ Part 125 (medium aeroplanes); Part 135 (helicopters and small aeroplanes); Part 137 (agricultural aircraft operations); Part 139 (aerodromes); Part 145 (aircraft maintenance organisations).

	<p>and night operations are conducted. The terminal is small but well-equipped with check in, baggage facilities, waiting areas and a small café. It is run by a Council-controlled trading organisation. Within the Council, there are four full-time staff that are responsible for airport operations (including the Airport Manager, two airport coordinators, and their Quality Manager). There are about 10 staff in total who undertake check in and baggage handling, but they are employees of their respective air operators.</p> <p>As a result of holding a Part 139 Certificate, they have a compliant Internal Quality Assurance Programme in place, as well as the systems and processes required to meet their HSE obligations.</p>
<p>Part 145 certificate: aircraft maintenance organisation</p>	<p>This maintenance organisation is capable of undertaking a number of different services including scheduled maintenance, role conversions, instrument servicing, electrical repair and overhaul, spares management solutions and engine overhaul and repairs. Their head office and main base is situated on the North Island, with bases at two other major airports in New Zealand also. There are 12 full-time staff working at this organisation including the Chief Executive, Chief Engineer, Quality Manager, administrative support, and 12 maintenance engineers.</p> <p>As a result of holding a Part 145 Certificate, they have a compliant Internal Quality Assurance Programme in place, as well as the systems and processes required to meet their HSE obligations.</p>