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OFFICIAL

DISCUSSION PAPER
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Post implementation review of CAO 48.1 Instrument 2019 (pilot fatigue rules)

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Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Artwork: James Baban.

Use of artificial intelligence

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Overview

Civil Aviation Order 48.1 Instrument 2019 (CAO 48.1) provides a framework for managing the risks of flight crew member (pilot) fatigue in Australian aircraft operations. In particular, appendices 1 to 7 of CAO 48.1 establish fatigue management settings for commercial operations, being operations that are not private operations.¹

CASA is conducting a post implementation review (PIR) of CAO 48.1, specifically in relation to commercial operations, following its commencement in 2019.

This discussion paper has been prepared to support discussion and elicit industry feedback that can inform a post implementation review (PIR) of CAO 48.1.

The paper is structured around the following key topics:

- Operations under Appendices 1 – 6.
- Operations under a fatigue risk management system (FRMS).
- Just reporting culture.
- Data (to assess the effectiveness of the framework and identify improvements).
- International developments.
- Opportunities for continuous improvement.

Accompanying the discussion paper is a PIR survey.

Broadly the PIR survey seeks feedback from pilots and operators on:

- the effectiveness of the CAO 48.1 scheme
- the efficiency, flexibility and accessibility of the CAO 48.1 arrangements
- industry rostering practices in relation to certain flying operations that may be a predictor of high(er) fatigue risk
- certain policy issues identified by CASA.

Pilots and operators may respond to all questions or only those most relevant to their perspectives, with or without reference to the discussion paper. Generally speaking, most questions will not be relevant to pilots who only conduct private operations.

¹ See the definition of 'commercial operations' in regulation 2 of the Civil Aviation Regulations 1988.

Why are we consulting

The purpose of the PIR is to assess whether the CAO 48.1 framework is effective and efficient in meeting its policy objectives for commercial operations, and to identify areas within the framework that could be improved to enhance safety and efficiency outcomes, for industry and for CASA.

This discussion paper has been developed to support consultation for the PIR. The PIR survey offers pilots and operators the opportunity to provide feedback on the CAO 48.1 framework. The feedback may inform options for potential future refinement or improvements to the CAO 48.1 framework. The feedback may also inform any future consultations to develop potential solutions to issues that are raised in response to this paper.

Subject to the feedback received during consultation, CASA anticipates that a PIR report outlining the outcomes of the review and future initiatives for improvement of the CAO 48.1 scheme will be released by late 2026.

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1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this discussion paper are listed in the table below.

Table 1: Acronyms

Acronym	Description
AC	advisory circular
AMC	Acceptable means of compliance
AEMS	Air Emergency Medical Services
AOC	Air Operator's Certificate
ATSB	Australian Transport Safety Bureau
CAR	<i>Civil Aviation Regulations 1988</i>
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998</i>
CAO	Civil Aviation Order
CE	certification specifications
EU	European Union
EASA	European Union Aviation Safety Agency
FSAG	Fatigue Safety Action Group
FAA	Federal Aviation Authority
FCM	flight crew member
FDP	flight duty period
FRM	fatigue risk management
FRMS	fatigue risk management systems
FTL	flight time limitations
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
MAAT	Manual Authoring and Assessment Tool
PICA	preliminary issue and consultation assessment
PIR	post implementation review
SPI	safety performance indicator
SMS	safety management system

Acronym	Description
TWG	Technical Working Group
TOD	top of descent
US	United States of America
ULR	ultra long range

1.2 Definitions

Terms that have specific meaning within this discussion paper are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this discussion paper and the civil aviation legislation, the definition in the legislation prevails.

Table 2: Definitions

Term	Definition
augmented crew operation	augmented crew operation means an aircraft operation in which 1 or more FCMs, additional to the minimum required number of FCMs, are engaged in a flight to allow 1 or more FCMs to be relieved of duty during flight time.
duty period	duty period means a period of time which: (a) starts when an FCM is required by an AOC holder to report for duty; and (b) ends when the FCM is free of all duties.
early duty	duty period between 2:00 am and 7:00 am.
enhanced fatigue management obligations	Requirements imposed by section 15.2 of CAO 48.1 on operators to whom one or more of Appendices 2 - 6 of CAO 48.1 applies.
fatigue	fatigue, for an FCM, means a physiological state of reduced alertness or capability to perform mental or physical tasks, which: a. may impair the ability of the FCM to safely operate an aircraft; and b. is caused by 1 or more of the following: i. the FCM's lack of sleep; ii. the FCM's extended wakefulness; iii. the FCM's circadian phase at any relevant time; iv. the FCM's workload of mental activities, or physical activities, or mental and physical activities at any relevant time.
fatigue risk management system or FRMS	A comprehensive system for managing fatigue-related risks that: a. is appropriate for the size, nature and complexity of the AOC holder's operations; and b. includes all of the elements set out in Appendix 7; and c. is approved for implementation by CASA.
flight time limitations or FTL	Collectively flight time, duty time and other limitations in CAO 48.1.
late duty	Duty period that finishes after midnight.
minor variation	CASA approved limited or minor non-compliance with the requirements of a specified provision of CAO 48.1.
window of circadian low or WOCL	For a FCM, means: a. in Appendix 2:

Term	Definition
	i. if the FCM is acclimatised — the period between the hours of 0200 and 0559 local time at the location where the FCM is acclimatised; or ii. if the FCM is in an unknown state of acclimatisation — the period between the hours of 0200 and 0559 local time at the location where the FCM was last acclimatised; and b. in an Appendix other than Appendix 2 — the period between the hours of 0200 and 0559 local time at the location where the FCM commences a duty period.
top of descent	The point at which an aircraft initiates a descent for the purposes of completing an approach and landing.

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website <https://www.legislation.gov.au/>

Table 3: Legislation references

Document	Title
Civil Aviation Order 48.1 Instrument 2019	Fatigue management
	<i>Civil Aviation Safety Act 1988 (Act)</i>
	<i>Civil Aviation Safety Regulations 1998 (CASR)</i>

Advisory material

CASA's advisory materials are available at <https://www.casa.gov.au/publications-and-resources/guidance-materials>

Table 4: Advisory material references

Document	Title
AC 119-12 v2.1	Human factors principles and non-technical skills training and assessment for air transport operations
CAAP 48-01 v3.3	Fatigue management for flight crew members
Gap Analysis Tool	CASA Fatigue Risk Management System (FRMS) Gap Analysis Tool
FRMS Handbook	Fatigue Risk Management System Handbook

Other references

Table 5: Other references

Document	Title
	<i>Transport Safety Investigation Regulations 2021</i>

1.4 Forms

CASA's forms are available at <http://www.casa.gov.au/forms>

Table 6: Forms

Form number	Title
Form 817	Fatigue Risk Management System Technical Assessor Worksheet
Form 824	Application Fatigue Risk Management System (Trial/Full) - Initial issue/Renewal/Change

2 Introduction

2.1 Issue and purpose

The purpose of this discussion paper is to support industry consultation that can inform a post implementation review (PIR) of the pilot fatigue rules in appendices 1 to 7 of Civil Aviation Order (CAO) 48.1 Instrument 2019. An outline of CAO 48.1 is set out in Chapter 3 of this discussion paper.

Pilot fatigue is a known safety hazard to aviation operations. Factors such as night flights, jet lag, successive early wake-ups, number of sectors flown per day, consecutive days on duty and disruption of circadian rhythms can contribute to levels of fatigue that impair a pilot's ability to safely operate an aircraft. The safety implications of pilot fatigue must be effectively managed to maintain safe flight operations.

CAO 48.1 provides a framework for managing the risks of pilot fatigue, with particular emphasis on commercial operations.

Since 2021, CASA has made significant progress in operationalising the CAO 48.1 framework, including in relation to the implementation of Fatigue Risk Management Systems (FRMSs), the development of internal procedures and practices and the development of guidance material for industry. Australia's commercial aviation industry has had time to understand the obligations of CAO 48.1 and embed and refine operational systems and procedures to align with legislative requirements.

Consistent with its commitment to continuous improvement, CASA had foreshadowed a PIR of CAO 48.1 in its Forward Regulatory Program.

2.2 Post implementation review - scope and timeline

The purpose of the PIR is to assess whether the CAO 48.1 framework is effective and efficient in meeting its policy objectives for commercial operations, and to identify areas within the framework that could be improved to enhance safety and efficiency outcomes, for industry and for CASA.

Ideally the survey would be completed after reviewing this discussion paper, but there are many questions that do not require this, if you prefer. A PIR survey associated with this discussion paper poses a series of questions to gather pilot and operator input, including on:

- the effectiveness of the CAO 48.1 scheme, with a focus on the performance-based elements that are crucial to the effectiveness of the scheme
- the efficiency, flexibility and accessibility of the CAO 48.1 arrangements
- rostering practices in relation to certain flying operations that may be a predictor of high(er) fatigue
- a list of policy issues identified by CASA

CASA invites responses to the survey by **2 November 2026**. CASA will use the feedback and comments received through this consultation to inform further policy analysis and potential improvement to the CAO 48.1 framework. As noted above, the survey will generally be less relevant to pilots engaged only in private operations.

Subject to the feedback received during the period of consultation, CASA anticipates that a PIR report outlining the outcomes of the review and identifying future initiatives for improvement of the CAO 48.1 scheme will be released by late 2026.

3 Overview of CAO 48.1

Fatigue is a physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person's alertness and ability to perform safety related operational duties.

Consistent with its functions under section 9 of the *Civil Aviation Act 1988* (Act), CASA is responsible for providing a regulatory framework for the management of fatigue safety hazards, and for oversight and enforcement to secure compliance with the framework.

CAO 48.1 commenced on 2 September 2019. Implementation of the CAO 48.1 rules was predominantly achieved by November 2021.²

CAO 48.1 sets out the rules for managing pilot fatigue hazards. The rules make pilot fatigue management in commercial aviation operations a shared responsibility between aircraft operators covered by CAO 48.1 and pilots.

CAO 48.1 places a condition on all flight crew licences that requires pilots to not commence a flight or related tasks (either privately or for an operator) if they are likely to be unfit to perform the task due to fatigue. For Operators of commercial operations must not assign a duty on a flight to a pilot if the operator reasonably believes that the pilot is or is likely to be unfit to fly due to fatigue.

CAO 48.1 supports three possible approaches to fatigue management:

1. the basic flight and duty time and other limits (these are collectively referred to as flight time limitations (FTL), set out in Appendix 1 to CAO 48.1
2. a series of less conservative FTL for different kinds of operations in Appendices 2 to 6 of CAO 48.1, subject to compliance with a set of enhanced fatigue management obligations in the CAO
3. implementation of a fatigue risk management system (FRMS) approved by CASA under Appendix 7 to CAO 48.1 that creates a bespoke set of fatigue settings for a particular operator.

Operators have the flexibility to choose the approach that best fits their operation, based on their requirements for flexibility and their capacity to manage their fatigue related risks. The approaches that are permissible under CAO 48.1 are described in greater detail below.

The effectiveness of the scheme relies not just on compliance with the prescriptive limits and requirements of CAO 48.1. It depends on the implementation of robust and effective fatigue risk management processes by operators. It also relies on pilots to exercise responsibility to not fly when fatigued and employ fatigue countermeasures to manage fatigue before, during and after flying.

3.1 Operations under Appendices 1 – 6 of CAO 48.1

For Appendices 1–6 of CAO 48.1, CASA prescribes FTL for groups of aviation operations. These FTL reflect a relative weighting of time awake, task complexity, time of day and sleep quantity/quality that are based on fatigue science pragmatically balanced with economic and cost impact considerations for operations within the Australian aviation context.

3.1.1 Operations under Appendix 1

Appendix 1 of CAO 48.1 sets out relatively restrictive FTLs without requiring operators to implement enhanced risk management processes. The FTLs for operations under Appendix 1 are broadly outside the window of circadian low (a time when physiological sleepiness is greatest and performance capabilities are lowest). The limits suit simple or non-complex operations. The pilot fatigue risks of aviation operations

² The 2019 instrument was amended for the inclusion of minor variations (section 5A), to change transition dates due to COVID and again as a consequence of flight operations regulations. The last amendment made in November 2021 took effect on 2 December 2021.

conducted under Appendix 1 are considered to be relatively low (in probability) due to the more restrictive FTLs that apply.

3.1.2 Operations under Appendices 2 -6

The limits in Appendices 2–6 are less restrictive compared to the FTLs in Appendix 1 but operators are expected to take additional steps to identify and mitigate their pilot fatigue risks within the constraints of the prescribed FTLs (for example by adjusting the limits to accommodate any factors unique to their operation associated with higher fatigue risks or implementing additional risk mitigations). This expectation is reflected in the enhanced fatigue management obligations that the CAO imposes on operators to whom Appendices 2–6 apply. These include requirements for operator procedures to continuously monitor and evaluate operator policies, limits and practices to manage fatigue hazards, and the provision of fatigue risk training to pilots.

CASA may approve requests from operators for limited or minor non-compliance ('minor variation') with the requirements of a specified provision of the CAO if CASA is satisfied that an acceptable level of aviation safety can be preserved. The minor variation mechanism allows operators to meet expected operational needs and risks in expected but exceptional circumstances unique to their operations.

Aviation operations under Appendices 2–6 include passenger transport, freight and charter operations and aerial work operations across various sectors, (for instance agricultural flying, firefighting, etc). Consistent with the diverse nature of the sectors operating under Appendices 2 – 6, the pilot fatigue risks for these operations may vary significantly.

3.2 Fatigue risk management system

Operators may implement a fatigue risk management system (FRMS) that is approved by CASA under Appendix 7 of the CAO.

Appendix 7 gives effect to a performance-based approach. It sets out the performance goals for a FRMS where a FRMS must be a safe, integrated, data driven system that continuously and effectively monitors and manages fatigue-related safety risks using scientific principles and knowledge, and operational experience, and it must enable the operator to assess the extent to which its pilots (and other personnel) perform at levels of alertness sufficient to ensure the safety of operations. Operators manage fatigue risk by setting goals, capturing data, measuring performance and system refinement.

The FRMS enables operational flexibility beyond the prescriptive limits in Appendices 1–6. To get approval, the operator must demonstrate to CASA that it has appropriate processes and mitigations to achieve an acceptable level of aviation safety.

Operations under FRMSs include high-capacity scheduled passenger transport operations by major Australian airlines as well as smaller passenger transport, freight, charter and emergency medical operations.

3.3 Development of CAO 48.1

CAO 48.1 was made after a lengthy policy development and consultation process that was aimed at achieving an effective and efficient set of pilot fatigue risk management rules that are appropriate to the diverse operations undertaken within the Australian aviation environment. The case for establishing CAO 48.1 was well researched and documented through this policy development process, which included:

- the commissioning of an Independent Review of Aviation Fatigue Rules for Operators and Pilots Civil Aviation Order [CAO] 48.1 Instrument 2013 (Independent Review) by CASA's Board in 2017 to provide CASA with an informed basis on which to reform Australia's pilot fatigue rules. The Independent Review in its 2018 final report made several recommendations to improve the pilot fatigue rules.³

³ [CASA Independent Fatigue Review - Final report, 20 March 2018.](#)

- public consultation on the recommendations made by the Independent Review in March–April 2018
- review of industry feedback and CASA’s proposed response to the Independent Review recommendations through a Technical Working Group (TWG) that was appointed in July 2018
- further public consultation on the draft CAO 48.1 between December 2018 and February 2019.⁴

One of the aims of the policy development process that preceded the making of CAO 48.1 was to ensure that Australia’s fatigue management rules were consistent with good international practice and current fatigue scientific knowledge. The development of CAO 48.1 in 2019 was informed by the latest international research and regulations, as well as by industry and expert inputs from TWG members.

⁴ See Summary of consultation on CD 1811OS - Modernising Australia’s Fatigue Rules, August 2019.

4 Operations under Appendices 1- 6 - Discussion

As observed in the preceding section, the development of the prescriptive FTLs of Appendices 2–6 (in 2019) was informed by the latest fatigue science, international best practice and industry and expert input.

Operators must elect which appendices they will use to manage fatigue risks and implement the relevant requirements including the applicable FTL constraints. CASA is particularly interested to understand industry's experience in implementing the enhanced fatigue management obligations for operations under Appendices 2–6, including the practical challenges that industry stakeholders may face in implementation of these obligations.

4.1 Enhanced fatigue management obligations

Typically, prescriptive approaches to regulation clearly tell regulated entities what they must or must not comply with, with little room for interpretation or flexibility. The approach under the more restrictive FTLs of Appendix 1 of CAO 48.1 can be characterised as a prescriptive approach. In comparison, operations under the less restrictive FTLs of Appendices 2–6 have a performance-based element.

CAO 48.1 identifies several different groups of operations and prescribes different fatigue management settings for each in Appendices 2–6. The FTLs in the Appendices are based on an identification of generic fatigue hazards within each of the relevant broad operational contexts and risk assessments supported by fatigue science and best practice. Factors that contribute to pilot fatigue that may be unique to different organisational and operational contexts may not be reflected in the prescribed FTLs (for example operation in harsh conditions, operational demands that result in higher task intensity, frequency of irregular operations, pilot experience etc.).

In order to set the limits for each of Appendices 2–6 as wide as reasonably possible, the CAO 48.1 framework relies on operators to manage the pilot fatigue risks that arise within their specific operational context. To supplement the FTLs and support the effective management of fatigue risk within those specific operational contexts, operators must implement enhanced obligations set out in section 15 of CAO 48.1 that include:

- fatigue hazard identification processes
- procedures for establishing FTLs (taking into account the identified fatigue hazards)
- procedures which provide for continuous monitoring and evaluation of policies, FTLs and practices, with a view to continuous improvement of fatigue risk management
- initial and recurrent fatigue risk management training and assessment for pilots. The training is intended to support pilots in understanding fatigue causes and fatigue related impairment, equip them with knowledge of how to manage fatigue risks and give them an understanding of the operator's fatigue related policies and practices.

The enhanced fatigue management obligations underpin an operator's obligation to not assign a duty on a flight to a pilot if the operator reasonably believes that the pilot is unfit to perform the duty because of fatigue.

CAO 48.1 does not specify the details of the policies and practices that must be adopted to meet the enhanced fatigue management obligations – operators have the flexibility to determine what is appropriate to their operational context. CASA's Civil Aviation Advisory Publication ([CAAP\) 48-01 - Fatigue management for flight crew members](#) provides guidance on how the enhanced fatigue management obligations may be acquitted. CASA expects that the fatigue risk management processes for operations under Appendices 2–6 are scaled to nature and size of the operation/operator. For operations under Appendices 2–6, operators can rely on more reactive fatigue hazard identification processes as opposed to the predictive, proactive and reactive fatigue hazard risk identification that is expected for operations under FRMSs (Appendix 7).

If an operator has an approved SAFETY management system (SMS), it is expected that processes within the SMS would be used for identifying and mitigating fatigue hazards. Operators without SMS or with little experience in SMS-type processes about how fatigue hazards may be mitigated can refer to CASA's guidance material (CAAP 48-01) and templates (see for instance [CASA's template resources](#)).

After the application of initial entry control processes for new operators under relevant flight operations regulations, CASA's interaction with operators operating under Appendices 1–6 primarily occurs through CASA's surveillance activities. There may also be some interaction with CASA's Aviation Safety Advisors.

The PIR survey seeks input on how the enhanced fatigue management obligations are being met across the diverse subsectors that operate under Appendices 2–6. Your feedback will help CASA identify where education or guidance or other regulatory action may need to be targeted to support the effectiveness of these obligations.

4.2 Minor variation

The minor variation provision in CAO 48.1 is a flexibility mechanism that enable operators with unique operational demands to seek minor variations from the prescriptive limits in Appendices 1–6 without the need to implement an FRMS.

During the CAO 48.1 policy development process, industry was concerned on one hand that even where operations fell clearly within a nominated rule set, the rule set would be overly prescriptive and not suited to the characteristics of an operation – hence the need for a flexibility mechanism. On the other hand, industry was also concerned that any flexibility mechanism needed to be managed by consistently applied policy with clear safeguards against the acceptance of increased risk without adequate controls.

CASA has developed guidance and procedures to assess and approve minor variations to CAO 48.1. CASA has published a minor variations policy that provides guidance on the underlying principles, the process for application and the information and documentation that must accompany an application for a minor variation.⁵ Under the policy, only limited or minor deviations are permitted, where they are supported by a demonstrated safety case having a scientific basis, and with a strong justification for departure from the CAO rules and operator flexibility, are permitted.

CASA minor variation approvals are supported by a rigorous assessment of the safety case for the variation and additional conditions are imposed that require the application of appropriate risk mitigations. As part of the approval process, CASA gains an understanding of the nature of the operations and works with the operator to identify fatigue risks and risk mitigations to ensure an acceptable level of safety.

Time frames for approval of a minor variation depends on the complexity of the operation(s). CASA is not aware of unreasonable delay costs to industry in relation to CASA's administration of minor variations. Minor variation approvals are generally granted by CASA for a period of up to one year, and these approvals are generally renewed on application, where justified with evidence of compliance with the appropriate mitigations and conditions of the previous approval.

The minor variation instruments issued by CASA includes a condition that the operator must provide CASA with deidentified fatigue risk management data if required. The data is requested and assessed by CASA when assessing an application for renewal of a minor variation. CASA's experience is that operators are generally compliant with the fatigue management conditions that are imposed as a condition of the approval. CASA provides operators with feedback where it is identified that there may be room for improvement.

Unlike in relation to FRMSs, there is no requirement in CASA's policy and application processes for evidence of any consultative process between pilots and operators in relation to a proposed variation. However, the minor variation approval instrument forms part of the operator's reference library and therefore should be available to its pilots. In addition, the operators' pilot fatigue training is expected to include matters that are bespoke to the operator.

The PIR survey includes questions to help CASA understand operators' experience of the minor variation arrangements.

⁵ [cao-48-1-instrument-minor-variations-policy.pdf](#)

4.3 Rostering practices in relation to certain duties

Through its oversight of FRMSs, CASA understands that some FRMS operators have adopted roosting practices that significantly inhibit or prevent 2 or more consecutive duty periods that overlap the hours of 2:00 am- 6:00 am without an intervening rest period. This is to manage predicted degradation in pilot alertness below baseline minima linked to consecutive duties.

CASA also understands that transitions between an early duty (for the purposes of this paper, this is a duty period that commences between 2:00 am and 7:00 am) followed by a late duty (for the purposes of this paper this is a duty period that ends after midnight), or a late duty followed by an early duty, correlates with higher reported pilot fatigue.

CASA is seeking feedback in the PIR survey to understand roosting practices in relation to these types of duties, in operations conducted under Appendices 1–6 of CAO 48.1. The intent is to gather information that will enable CASA to take a risk-based approach to evaluate what further consideration or action, if any, is warranted in relation to this issue.

5 Discussion of operations under FRMS

5.1 Establishment of the FRMS scheme

Under Appendix 7 of CAO 48.1, CASA reviews and approves FRMS operators' processes for fatigue hazard identification, risk assessment and mitigation, and reviews and approves operators' FTLs for each part of their operations covered by the FRMS.

As of 30 July 2026, there are 30 approved FRMSs in operation (including 4 FRMSs that were approved prior to November 2021). This number includes both trial FRMS approvals and final approvals. Of the 30 approvals, 15 have a full FRMS implementation approval.

FRMS trial approval periods for some operators have exceeded 2 years, this was partly because the data collected by trial FRMSs during the period impacted by the COVID-19 pandemic (roughly early 2021 to late 2022) could not be considered to reflect 'normal' operating conditions. Also, CASA was still developing its 'exit from trial' procedures and requirements so that operators who were operating under trial FRMS approvals could work towards those requirements.

CASA's FRMS-related procedures are now well established, and it is anticipated that FRMS trial approval periods will be shorter in the future. CASA recognises however, that the time taken for full approval will depend on a range of factors including for instance timely receipt of documentation and evidence to support an application from applicants.

CASA is interested in understanding industry's perspectives on the operation of the FRMS arrangements. The questions in the PIR survey elicit feedback on the matters discussed below.

5.2 FRMS guidance

Since 2019, CASA has published several resources that explain and detail the requirements for obtaining approval for an FRMS, including the FRMS Technical Assessor Worksheet ([Form 817](#)), Fatigue Risk Management System Handbook ([FRMS Handbook](#)) and the [FRMS gap analysis form](#).

CASA's FRMS Handbook has been designed as guidance for both CASA assessors and FRMS applicants. The FRMS handbook and FRMS Technical Assessor Worksheet are due to be reviewed and re-published with enhancements in 2026. There is also extensive guidance on FRMS implementation available from a number of organisations including ICAO and IATA. CASA is currently developing 'Exit from FRMS Trial' worksheets that list acceptable means of compliance in some detail. The worksheets are currently in draft form and will be subject to testing with the industry.

5.3 FRMS scalability

During the development of CAO 48.1, concerns were raised by operators that the CAO's FRMS requirements applied a large-scale regular passenger transport 'gold standard' to all operators seeking an FRMS approval, with 'economy of scale' implications for smaller operators.

In practice, it appears that CASA's FRMS requirements are scalable to organisation size and risk. Approvals have been granted to a number of smaller operators/operations. Generally, an operator's costs to implement a FRMS will depend on their scale of operations, existing capability prior to implementation and the additional capability required to manage fatigue risks within the FRMS. It may be that for smaller operators with established SMS, the step up in effort and cost to implement a FRMS is not as onerous/cost prohibitive as was initially anticipated. Table 7 shows a sector break down of FRMS approvals.

Table 7: FRMS approvals according to sector

Industry sector	FRMS approvals
Part 121 scheduled services	11
Part 121 non-scheduled services	4
Part 133 oil and gas	3
Part 138 rotary emergency medical service (EMS)	3
Part 135 air transport	2
Part 135 EMS	3
Part 138 rotary aerial work	3
Part 133 marine pilot transfer	1

Note: Table 7 is intended to provide a broad representation of sector distribution. It is not intended to be definitive as to the number of approvals for each sector as there may be overlap between the sectors for some FRMS approvals.

5.4 CASA's oversight of FRMS

Structurally, an FRMS is composed of processes and procedures for identifying, measuring, modelling, managing, mitigating, and reassessing fatigue risk in a specific operational setting. An effective FRMS is a collaborative process that involves operators and pilots in joint action. Enablers of effective FRMSs include a just reporting culture that supports fatigue reporting and a mature safety management culture that supports continuous improvement in response to fatigue risk. An effective FRMS enables operators to assess the extent to which their pilots perform at levels of alertness sufficient to ensure the safety of operations.

CASA may grant a trial FRMS implementation approval if it is satisfied that:

- each element of the operator's FRMS complies with and meets the requirements, attributes and characteristics of a FRMS as described in sections 2–7 of Appendix 7 of CAO 48.1
- the FRMS is a safe, integrated, data-driven, system that appears to be reasonably capable of continuously and effectively monitoring and managing fatigue-related safety risks, using scientific principles and knowledge, and operational experience
- the FRMS will enable the operator to assess the extent to which pilots perform at levels of alertness sufficient to ensure the safety of operations
- the FRMS can deliver:
 - the identified safety outcomes
 - the fatigue-risk data and reports
 - continuous improvement in the delivery of safety outcomes.

After a trial FRMS implementation approval is issued, CASA works closely with trial FRMS approval holders to ensure that CASA is fully informed of the progress of the functionality of the FRMS. The FRMS approval holder is required to provide CASA with evidence that demonstrates the functionality of all aspects of the FRMS. CASA attends a significant proportion of Fatigue Safety Action Group (FSAG) meetings conducted by new FRMS trial approval holders, and it receives the FSAG minutes and data packs for each meeting. The

aim of CASA's attendance at FSAGs is to observe how the operator's FRMS systems and procedures respond to and manage the fatigue risks to bring it to an acceptable level.

After being on the trial approval for at least 12 months, an operator may request CASA to conduct the final assessment for full FRMS approval implementation. CASA may grant a final approval only if satisfied on the basis of relevant data and reports provided by the operator that the FRMS is demonstrably delivering the safety outcomes expected when the trial FRMS implementation approval was given; and is capable of delivering continuous improvement in the delivery of safety outcomes.

The assessments of applications for renewal of FRMS approvals (every two years) or approvals of any significant changes to FRMS provide touchpoints for CASA's oversight of fully approved FRMS. These are in addition to planned surveillance of fully approved FRMS conducted by CASA.

CASA's procedures to assess FRMS 'entry into trial' and 'exit from trial' are well established. Procedures and practices for oversight of operators operating under a full approval are being finalised. As more operators begin to exit trial, CASA is increasingly focussing on developing its oversight procedures for fully approved FRMS. This includes the development of technical assessor worksheets and internal guidance materials for inspectors. CASA needs to ensure through appropriate oversight that fully approved FRMS are functioning as intended and continually improve overall performance to maintain safety goals. Oversight mechanisms available to CASA could include scheduling of formal audits, general inspections, desk-top reviews and periodic reviews of Safety Performance Indicators. CASA will consider cost effective, data driven strategies that could be implemented to support routine data analysis for efficient monitoring and oversight of fully approved FRMS.

5.5 First-of-kind operations

Operations under FRMS are being extended to first-of-kind operations, for example ultra long-haul operations.

CASA's existing procedures for the assessment and approval of significant changes to FRMS have proven adequate to support the assessment of this type of operations. CASA will generally work closely with an operator to provide information and guidance about information required to support an assessment, and to ensure that the fatigue risk hazard identification and mitigation procedures are appropriate to the operations.

As noted previously, CASA's FRMS handbook and FRMS Technical Assessor Worksheet (Form 817) are due to be reviewed and re-published in 2026. CASA intends to amend guidance material to provide additional considerations to mitigate risks associated with increasing flight duty periods beyond the prescriptive limits for ultra long-range flights (i.e. flights greater than 16 hours) in the updated handbook and worksheet.

6 Just culture

The safety implications of fatigue are difficult to manage if the pilots experiencing fatigue are unwilling or unable to report fatigue related issues. The CAO 48.1 framework relies on pilots not flying if they are too fatigued to fly safely. The effectiveness of the CAO 48.1 framework is supported by the existence of a 'just culture' reporting environment within which pilots are encouraged, and are comfortable, in reporting fatigue related information (to their operators or to investigative bodies like the Australian Transport Safety Bureau (ATSB)). This is true for operations under Appendices 1–6 as well as for operations under Appendix 7 (FRMS) of CAO 48.1.

Open fatigue reporting enhances the collection of data and information that aids in fatigue risk identification and mitigation. It fosters safer operating practices by supporting internal evaluation and learning and improvement. Just culture reporting goes beyond pilots calling in when fatigued or reporting fatigue related incidents or accidents. It contemplates pilots being able to freely disclose information and discuss issues with their operator that are linked to fatigue and alertness.

The willingness of pilots to participate in fatigue reporting within their organisation, and the extent to which they are able to do so, is linked to the safety culture of an organisation. Safety culture is an expression of how safety is perceived, valued and prioritised by management and employees within an organisation.

An effective fatigue reporting system requires an open and fair reporting culture. Best practice reporting systems generally:

- have clear leadership support
- use forms and processes that are easy to access, complete and submit at appropriate times
- have clear unambiguous voluntary reporting protections
- include regular analysis of the reports to provide feedback to pilots about decisions or actions taken based on the reports and lessons learned
- are promoted through training, information and instruction.

For operations under FRMS, a well-run and effective Fatigue Safety Advisory Group (FSAG) comprising of representatives of all stakeholder groups (management, scheduling staff, and pilots) would operate as a focal point for coordinating fatigue related activities, including promoting a just culture for fatigue reporting so that pilots feel safe to report fatigue related information without fear of punitive action.

CASA applies just culture principles in the performance of its regulatory functions and the exercise of its regulatory powers. CASA extends just culture protections beyond information that is reported to CASA (voluntarily or otherwise) to include all situations in which CASA becomes aware of a person's acts or omissions that may contravene applicable regulatory requirements. Essentially, just culture principles operate to protect individuals from punitive or disciplinary action for 'honest mistakes' made in the course of performing their aviation-related functions, where the conduct involved is voluntarily reported in accordance with applicable procedures, and the act or omission is commensurate with an individual's experience, qualifications and training.⁶

REPCON is a voluntary and confidential reporting scheme that allows any person who has an aviation safety concern to report it to the ATSB confidentially.⁷ Protection of the reporter's identity and any individual referred to in the report is a primary element of the scheme.

CASA recognises that pilots may also fly while fatigued for a range of factors including for instance because they did not realise they were fatigued or not wanting to let fellow crew members down or to avoid pay implications, etc.

⁶ [Our regulatory philosophy](#) | Civil Aviation Safety Authority. See also CASA's [just-culture-directive](#).

⁷ See REPCON – Aviation Confidential Reporting Scheme | ATSB.

The tools that CASA has at its disposal to build a fatigue reporting culture and encourage pilots to not fly when fatigued are:

- training for pilots to recognise fatigue risks (imposed through legislation, CAO 48.1 requires operators to provide fatigue training to their pilots, the content of the training is set out in the CAO)
- education and guidance (to explain regulatory requirements, the compliance obligations of operators and pilots, and just culture principles)
- compliance action (to monitor compliance).

CASA is interested in exploring actions that CASA and industry could take to strengthen and support the maturing of a just reporting culture in the aviation industry. Initiatives could include for instance collaborative development of promotional material and e-learning content, the provision of a sharing platform for exchange of best practices or guidance material with practical examples targeted to certain sectors.

7 Pilot fatigue data considerations

The regulatory premise for CAO 48.1 is that the CAO 48.1 framework manages the risks of pilot fatigue to achieve an acceptable level of aviation safety. A key question for CASA is how well does the CAO 48.1 framework achieve the desired safety effects?

In 2018, CASA consulted with industry on the recommendations made by the Independent Review. In response to industry feedback (through the public consultation and TWG), CASA stated that it would commission regular third-party surveys of industry to establish a fatigue baseline, assess the impact of fatigue rules and identify further continuous improvement opportunities. The survey approach was intended to inform future regulatory development.⁸ In its subsequent summary of consultation on the draft CAO 48.1 in 2019, CASA mentioned its intent to conduct fatigue surveys/research to establish a fatigue baseline and to assess if the changes to the CAO had been effective in reducing fatigue risk.

CASA's initial implementation activities in relation to CAO 48.1 prioritised the development of documents, internal processes and external guidance to support operators in smoothly transitioning to the CAO 48.1 framework. Significant effort was directed towards embedding systems and processes to support FRMS approvals based on the higher safety risk profile of passenger carrying operations conducted under FRMSs. CASA's initial implementation activities were also disrupted by the effects of the COVID-19 pandemic. As a result, the action of undertaking an industry survey has not yet been put into effect by CASA.

CASA has considered how the intent of the survey as proposed in 2018 can be met at this stage. The underlying aim of the proposal was to collect data that:

- supports an assessment of the impact of CAO 48.1 on aviation safety
- provides an evidence base that can support the identification of improvements to the pilot fatigue framework.

7.1 Aviation safety incident data

There is insufficient quantitative data to reliably draw a causal link between the regulatory settings of CAO 48.1 and aviation accidents and incidents.

The ATSB receives reports of aviation accidents, serious incidents and incidents that meet the reporting requirements of the *Transport Safety Investigation Regulations 2021*. The incidence or pervasiveness of fatigue factors that may contribute to aviation accidents or incidents cannot however be reliably estimated by referring to ATSB accident and incident data. This is because fatigue is generally underreported and difficult to reliably identify as a causal factor in aviation accidents and incidents. Fatigue may be one of a complex combination of factors that contributes to a safety accident or incident, for example high workload in combination with fatigue due to undertaking other employment on days off or interrupted sleep. In these situations, fatigue may not be identified as the factor that contributed to accident/incident.

A scan of ATSB aviation safety accident/incident investigation reports between 2019 and 2025 indicates a low number of accident/incidents in which pilot fatigue was implicated as a safety factor contributing to the accident or incident.⁹ The low number of reports is statistically insignificant to support a quantitative assessment of the impact of CAO 48.1 on aviation safety outcomes.

It may well be that relevant data that draws a link between aviation safety occurrences and CAO 48.1 continues to be very limited. Australia's strong aviation safety record translates to a low number of aviation safety occurrences and a much smaller number in which pilot fatigue may be identified as a safety factor.

⁸ This action was not a recommendation of the [Independent Review](#).

⁹ A scan of ATSB aviation investigation reports published between 1 January 2019 to 31 December 2025 indicates that the ATSB identified pilot fatigue as a safety factor (i.e. a contributory factor) in 4 accidents/serious incident reports. See AO 2021-052, AO 2023-004, AO 2023-016, AO 2023-017.

7.2 Pilot fatigue survey

Measurement tools that are widely used to measure fatigue can range from subjective (based entirely on an individual's recall or perceptions) to objective (such as performance tests and different types of physiological monitoring).

A survey of pilots' perceptions of fatigue along with information about fatigue related indicators such as amount of sleep, hours awake and flight time and flight duty periods, etc. could potentially be used to get an understanding of Australian pilots' experience of fatigue, and the factors that may be contributing to that fatigue. This information could potentially then be used to identify improvements to the CAO 48.1 framework. This was the intent of the survey proposed in CASA's actions in response to the Independent Review before the finalisation of the CAO 48.1 framework.

Fatigue surveys would need to be conducted at regular intervals for comparison against a baseline (once the baseline is established).

Now that the CAO 48.1 framework has been operational for several years, CASA notes that:

- In relation to operations under an FRMS, generalised data from a pilot fatigue survey is likely to be of limited value in identifying improvements. An analysis of the FRMS data inputs and outputs, including operator performance against agreed Safety Performance Indicators is likely to provide more reliable evidence of effectiveness of individual FRMS and areas for improvement rather than the generalised results from a pilot fatigue survey. CASA's oversight of individual FRMS includes review and analysis of relevant data from FRMS operators.
- FRMS data (that CASA has access to) can provide insights into the fatigue risks associated with certain aviation operations. For example, FRMS data may indicate that FRMS operators are generally not operating to the full extent of a prescriptive FTL due to the associated fatigue risks or may indicate the types of risk mitigations that are being adopted for certain operations. These insights may potentially provide an evidence base to support policy changes to the CAO 48.1 framework or changes to CASA's guidance materials, etc.
- The diverse sectors operating under Appendices 1–6 have vastly differing concerns, priorities, levels of influence and ability to engage with a fatigue survey. It is uncertain that a one-size-fits-all fatigue survey is the best mechanism to gather data regarding the fatigue risk of operations under these Appendices.

The costs to both industry and Government of acquiring and analysing meaningful data in these circumstances must be weighed against the benefits that may reasonably be anticipated from the data.

7.3 Industry consultation

As noted previously in this paper, the CAO 48.1 framework gives effect to prescriptive and performance-based approaches to legislation. Key elements of the framework include effective fatigue risk management (by pilots and operators), and a strong reporting and safety culture.

The effectiveness of CAO 48.1 depends on the effective functioning of the performance-based (cultural and organisational) elements of the framework. Information from pilots and operators that provides insights on how these elements of the framework are currently performing could potentially be very useful to CASA in identifying how to improve the effectiveness of the CAO 48.1 framework.

Questions have been included in the PIR survey to elicit information that could assist CASA in identifying areas of particular fatigue risk as well as in identifying areas for regulatory focus (through policy or regulatory change, education and guidance or compliance and oversight).

The relevant data on which CASA will base its assessment of the effectiveness and impact of CAO 48.1 framework will include the responses to the PIR survey, as well as other available data that CASA has access to through its regulatory activities (for instance information on approaches taken in peer jurisdictions, fatigue related scientific research, insights from FRMS and other oversight activities, etc).

CASA is open to input on alternative approaches that it could take to support the development of a robust evidence base on which it can base an assessment of the effectiveness of the CAO 48.1 framework.

8 Developments in peer jurisdictions

To inform the PIR, CASA conducted a scan of fatigue regulatory approaches in peer jurisdictions with broadly similar regulatory environments to Australia, focussing on developments that have occurred since the CAO 48.1 framework was implemented. The rules in the United States (US), the European Union (EU) and Canada were reviewed.

A comparison of fatigue rules across jurisdictions is not straightforward due to fundamental structural differences in how jurisdictions organise fatigue rules as compared to the tiered model of CAO 48.1 (i.e. FTLs for different groups of operations differentiated in Appendices supplemented by the enhanced fatigue management operator obligations, a mechanism for minor variations to prescriptive FTLs and an option for FRMSs).

For passenger carrying operations, the US Federal Aviation Authority (FAA) largely relies on a uniform prescriptive rule set, along with record keeping and fatigue training requirements. Certificate holders may not exceed any provision unless approved by the FAA under a FRMS that provides at least an equivalent level of safety. There is no mechanism similar to that provided by CAO 48.1 for minor variations to the FTLs.¹⁰

For scheduled and charter commercial air transport operations, the EU's regulatory framework for managing pilot fatigue relies on baseline FTLs in EU regulation supplemented by operator-specific FTL specification schemes that must align with detailed certification specifications supported by acceptable means of compliance (AMC) and guidance material. A comprehensive FRMS is typically required to add flexibility beyond the prescriptive scheme.¹¹

Transport Canada combines prescriptive limits with explicit operator fatigue-management, reporting, monitoring and record-keeping obligations. An FRMS pathway can be used to obtain exemptions/variances from specified prescriptive provisions subject to Transport Canada approval and a safety case process.¹²

The prescriptive regimes in all jurisdictions typically manage fatigue by combining minimum rest opportunities (time free of duty) with explicit or implicit sleep opportunities within that rest, capping acute workload (for example through limiting FDPs according to sectors flown), preventing cumulative fatigue and specific restrictions for operations conducted during the window of circadian low. There is variance across jurisdictions in how these elements are balanced and as noted above variance in how the prescriptive limits are given effect to.

The next section of the paper briefly summarises some notable developments from the EU and Canada.

8.1 European Union

During the adoption of the European Union's FTL requirements for scheduled and charter airline operations in 2014, the European Union Aviation Safety Agency (EASA) was mandated to perform a continuous review of those requirements. The first phase of EASA's research assessed the impact of 'night duties longer than 10 hours' and 'disruptive schedules' on the fatigue of aircrews.¹³ The research found an increased probability of high fatigue levels during nights and duty periods with late finishes, no significant increase of probability of high levels of fatigue at Top of Descent (TOD) for early start FDPs, and a marginal increase for mixes of disruptive schedule FDPs. The study report took the view that prescriptive limits alone are not sufficient to

¹⁰ The fatigue rules in [14 CFR Part 117](#) apply to passenger operations conducted under Part 121 and certain related Part 91 operations. The FTLs for all-cargo Part 121 operations are in Part 121 (Subparts Q/R/S for domestic/flag/supplemental all-cargo), with an option for a certificate holder to elect to apply Part 117 to specified all-cargo operations.

¹¹ [Commission Regulation \(EU\) No 965/2012](#) – Annex III Part ORO – Subpart FTL for CAT. Note: Air taxi, emergency medical service and single pilot CAT operations by aeroplanes are currently subject to the requirements in Subpart Q of Annex III of Regulation (EEC) No 3922/91. EASA Opinion 20/2026 proposes a move to harmonised, updated rules for these operations.

¹² Part VII, Division III of [Canadian Aviation Regulations \(SOR/96-433\)](#) (Flight crew member fatigue management) and Division V – Exemptions - Fatigue Risk Management Systems.

¹³ Effectiveness of flight time limitations (FTLs), EASA, March 2019.

prevent high fatigue during night flights. It suggested that the effectiveness of fatigue risk management may be improved by increasing operators' and aircrews' awareness of the types of duties where the risk of fatigue is higher, and by promoting prior sleep and rest opportunities during such duties.

In 2023, EASA published ED Decision 2023/023/R28 incorporating the recommendations of the study into the regulatory framework.¹⁴ The Decision amended certification specifications¹⁵ and acceptable means of compliance,¹⁶ to require 'appropriate fatigue risk management (FRM) for late night and late-night finish operations. 'Appropriate FRM' refers to principles and tools that support an operator in managing fatigue hazards through the operator's SMS – it is intended to support compliance with the FTLs and is distinguishable from a full-fledged FRMS which supports deviation from the prescriptive FTLs.

The results of EASA's FTL 2.0 research study were published in 2024.¹⁷ Key findings were that duty duration was a consistent predictor of fatigue, along with start time, prior sleep quantity, and time awake. Crew category and individual factors, such as age and gender, were also found to influence fatigue levels. The results suggested that controlled rest was an effective tool for managing fatigue. The report stated that because of the complex interactions of factors influencing the probability of reaching high levels of fatigue, additional further restrictions on maximum FDPs and numbers of sectors may not be effective. Instead, effective mitigation measures should be tailored to the specifics of the operation and 'appropriate FRM' principles should be applied to optimise crew alertness on flights of long duration.

When developing the FTL requirements for commercial air transport operators under EU Regulation 965/2012, EASA prioritised scheduled and charter operations with aeroplanes. In February 2026, EASA published Opinion No 02/2026,¹⁸ proposing updated FTL requirements for commercial air transport with aeroplanes used in air emergency medical service (AEMS), air taxi and single-pilot operations. The Opinion introduces harmonised, operation-specific FTL and rest requirements tailored to the risk profiles of these sectors, establishes explicit daily FDP limits for these operations and defines rules for standby, split duty and in-flight rest. It clarifies operator and competent authority responsibilities, including oversight and approval processes for individual FTL specification schemes that air taxi or AEMS operator will need to develop.

8.2 Canada

In 2024, Transport Canada released a preliminary issue and consultation assessment (PICA) signalling its intent to begin consultation with stakeholders on issues and potential near-term solutions associated with its FRMS and prescriptive FTLs rules.¹⁹ Transport Canada's summary of the consultation states that overall industry expressed consensus that the regulations are too complex and confirmed the incompatibility of the current FRMS rules with smaller on demand operations. Operators requested clarity, and improvement on a number of definitions, concepts, interpretations, and specific requirements in the ruleset. Transport Canada stated that it would be exploring improvements that may be possible without comprising aviation safety.²⁰

¹⁴ ED Decision 2023/023/R.

¹⁵ The Certification Specifications (CS) are non-binding technical standards issued by EASA, which indicate the means to demonstrate compliance with EU Regulation 2018/1139 and which are used by persons and organisations for the purpose of certification.

¹⁶ Acceptable means of compliance are non-binding standards issued by EASA, which are used by persons and organisations to show compliance with EU Regulation 2018/1139.

¹⁷ See FTL- D2.5, Merge of results from First and Second projects, EASA, 10 April 2025.

¹⁸ EASA [Opinion No 02/2026](#).

¹⁹ See PICA 2024 -001: Fatigue, Transport Canada [here](#).

²⁰ See 'What we Heard Report - Preliminary Issue and Consultation Assessment – Fall 2024', Transport Canada [here](#).

9 Continuous improvements

9.1 CASA's implementation of actions from the Independent Review

In 2018, in response to recommendations made by the Independent Review and following industry consultation on the recommendations and TWG feedback, CASA identified a number of actions for implementation. The implementation of CAO 48.1 and related actions (including the publication of amended guidance material and development of internal training) addressed a majority of the actions that were identified. CASA's progress in implementing a small remainder of longer-term actions is outlined in Table 8 below.

Table 8: CASA's acquittal of actions identified in response to the Independent Review (IR) recommendations and industry and TWG feedback

Action number and recommendation in response to the IR	CASA actions
Action 1-1: CASA will form a working group with ATSB and selected industry participants to develop a definition and methodology for reporting and assessing fatigue within safety incidents and occurrences.	CASA and the ATSB have discussed this action and the agencies remain prepared to meet on this issue if appropriate.
Action 4-2: CASA will seek further advice from the Aviation Safety Advisory Panel regarding the need for a multiple tier FRMS.	CASA's experience with assessing and approving FRMSs since 2019 across broad segments of the industry suggests that existing FRMS requirements are appropriate in providing scalable pathways for FRMS. CASA therefore now takes the view that there is limited need for multiple formal tiers of FRMS. This is also consistent with ICAO standards.
Action 5-2: CASA will develop a sample FRMS manual to be made available in CASA's Manual Authoring and Assessment Tool (MAAT) with multiple examples of acceptable means of compliance to demonstrate an appropriate level of detail to operators and CASA inspectors	The FRMS Technical Assessor Worksheet (Form 817) serves as guidance for CASA assessors and applicants, drawing on resources from CASA, ICAO and IATA. CASA does not consider it necessary to update the MAAT for the same purpose.
Action 5-9: CASA will amend guidance to clarify how an FRMS can be managed across a commercial group of operators.	To date CASA has approved 4 FRMS for separate Air Operator's Certificates (AOCs) that have a common owner, in a similar manner to having common key personnel across two AOCs. Additional guidance for this action is to be included in updates to the FRMS Handbook and FRMS Technical Assessor Worksheet to be published by 31 December 2026
Action 5-10: CASA will conduct a dedicated campaign in conjunction with industry associations to communicate the availability of a scaled FRMS solution	CASA did undertake a campaign to raise awareness of the FRMS scheme, but not in conjunction with industry associations. At present, demand for FRMS approvals remains low and CASA considers that there is reasonable

Action number and recommendation in response to the IR	CASA actions
	flexibility and scalability in the FRMS scheme. This is supported by the range of organisations using an FRMS. CASA has further promoted flexibility arrangements in the FRMS scheme, in guidance published on 29 March 2026.
Action 5-13 CASA will amend guidance material to provide additional considerations to mitigate risks associated with increasing flight duty periods beyond the prescriptive limits for ultralong range (ULR) operations.	There are only 2 ULR operators in Australia – both with FRMS approvals. CASA is preparing additional guidance for this action to be published by 31 December 2026.
Action 25-1: CASA will commission regular third-party surveys of industry to establish a fatigue baseline, assess the impact of fatigue rules and identify further continuous improvement opportunities	The intent underlying this action was to collect data to assess the impact of CAO 48.1 in order to identify improvements to the CAO 48.1 regulatory settings. The PIR survey seeks to elicit information that can achieve this intent.
Action 25-2: CASA will develop guidance regarding the relationship between fatigue reports and reporting culture.	There is guidance available in CAAP 48-01 and the FRMS Handbook. CASA will examine reporting culture issues during the PIR to determine whether further action is necessary or appropriate.
Action 25-3: CASA will develop guidance material that provides a clear picture of how the different fatigue mitigations within CAO 48.1 interact to provide holistic mitigation of fatigue risks in accordance with fatigue management principles	There is guidance available in CAAP 48-01 and the FRMS Handbook. CASA investigate reporting culture issues to determine whether further action is necessary or appropriate in the course of the PIR.
Action 25-8 CASA will monitor data from fatigue surveys and fatigue reporting to assess whether further changes to Part 137.Q can be supported, or if CASA should remove prescriptive flight duty periods from this sector	CASA is not planning a review of Part 137 of CASR in the immediate future.
Action 25-9 As operators successfully implement FRMS, CASA will publish additional acceptable means of compliance to assist other operators.	CASA will supplement existing CASA processes with additional guidance that is in development
Action 25-12 CASA will transition the fatigue rules from CAO to CASR after completion of transition to both the fatigue rules and the flight operations rules	Limited capacity for the amendment of CASA regulations has prevented progress on this action.

9.2 Improvements to the framework

The preceding chapters of this paper consider the structural elements of the CAO 48.1 framework. In addition to this strategic, overarching, whole of instrument consideration, CASA is also seeking to explore certain more granular policy issues.

9.2.1 Policy issues for further consideration

CASA has identified the issues discussed below through industry queries to CASA's Regulatory Guidance area, informal industry feedback and suggestions for regulatory improvements received through CASA's

Improve Rules webform. The PIR survey affords an opportunity to provide any comments that you may have in relation to these issues.

Potential issues that CASA considers are of a minor or procedural or routine nature are not discussed in this paper. The list of issues discussed in this section of the paper does not preclude the consideration of other policy issues during the PIR or outside the PIR consultation process.

CASA is not currently proposing that these issues will result in amendments to CAO 48.1. CASA is providing information on each issue and inviting relevant comments. The comments will assist CASA in identifying where more work and analysis may be needed, which may inform options for potential future improvements or refinement of the CAO 48.1 framework to be identified in the PIR report. If CASA decides that an amendment to the CAO may be appropriate, we will separately consult on the change.

9.2.1.1 Augmented crew operations under Appendix 2

The FDP and flight time limits that apply to multi-pilot operations conducted under Appendix 2 of CAO 48.1 may be increased in an augmented crew operation (section 5, Appendix 2 of CAO 48.1). An augmented crew operation is an operation conducted with more than the minimum required pilots to allow for one or more pilots to be relieved of duty during flight time.

Operator procedures for assigning pilots to an augmented crew FDP must ensure that the pilots that are part of the operating crew at the end of the FDP are the same pilots who commenced the first sector of the FDP (see section 5.3 (b), Appendix 2). The underlying safety rationale for this requirement is that a similar fatigue status of all the pilots in the augmented operation supports fatigue management during the flight, this would be complex if the pilots have significantly different duty times and fatigue/alertness levels.²¹

CASA would like to understand whether the condition in section 5.3(b), Appendix 2 continues to remain proportionate to the fatigue safety hazard it seeks to control. CASA invites industry comment on this issue, including on the impact and effectiveness of the requirement on pilot fatigue management.

9.2.1.2 Recognition of prior initial training

Part 119 of CASR requires air transport operators to have a program for training and assessing operational safety-critical personnel in human factors (HF) principles and non-technical skills (NTS) (regulation 119.175 of CASR).²² CASA Advisory Circular AC 119-12 v2 provides guidance for operators when developing a HF/NTS training and assessment program. In relation to recognition of prior HF/NTS learning, the approach (explained in the AC) is that if an operator chooses to recognise a person's previous HF/ NTS training, the operator is responsible for documenting the process to identify any gaps through a training needs analysis and must determine the additional training needed to meet the operator's HF/NTS training and assessment program for the person's role and operational context. Recognition of prior learning must be based on verifiable evidence, with each decision documented in the trainee/learner's training records.

Section 15A of CAO 48.1 sets out a similar approach but with a higher level of prescription than Part 119 of CASR (see sections 15A.3 and 15A.4, CAO 48.1).

Recognition of prior learning is a useful industry mechanism to reduce regulatory burden. It is unclear to what extent section 15A is being utilised by industry, and whether simplification of the requirements could improve the utility of the provision.

CASA is seeking industry feedback on section 15A of CAO 48.1 with the preliminary proposal of simplifying it, if it is appropriate to do so.

²¹ See the guidance on this requirement is set out in section C.5 of CAAP 48.1

²² Regulation 119.175 of CASR. Australian air transport operators taking advantage of the exemptions in Part 6 of CASA EX73/24 are not yet required to have an HF/NTS TAP. These exemptions end on 1 December 2026.