



Advisory Circular

Subject: Exemption and Safety Case Process for Fatigue Risk Management Systems

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1.0 Introduction

- (1) This Advisory Circular (AC) provides information and guidance to comply with regulatory requirements. This AC on its own does not set minimum standards or change, create, amend or approve deviations from regulatory requirements.

1.1 Purpose

- (1) This document explains in plain language the process for an air operator to qualify for exemptions from specific provisions of the flight, duty and rest requirements in Part VII, Divisions III and IV; and, Subpart 2, Division X of the *Canadian Aviation Regulations* (CAR) as published in the *Canada Gazette*, Part II on 12 December 2018.

1.2 Applicability

- (1) This document applies to the holders of Air Operator Certificates in accordance with CAR 702, 703, 704 and 705.

1.3 Description of changes

- (1) The following changes were made to the previous issue of this Advisory Circular:
- (a) 2.3(1)(c) Definition of “black hole” approach: amended to add aerodromes
 - (b) 4.0 Applicability: added link to in-force dates on TCCA webpage
 - (c) 6.1(3) FRM plan and process: added documentation review
 - (d) 6.2.1 Variance nature and scope: editorial changes
 - (e) 6.2.1(3)(b): note added regarding seasonal applicability of exemption
 - (f) 6.2.3(1) Safety case description: editorial changes for clarity; added initial risk assessment findings and modelling assumptions
 - (g) 6.2.5(1)(b) NOI submission: added suggested timeframe for submission
 - (h) 6.2.6: added change in status of an NOI
 - (i) 6.3.5(1)(c) Data collection: added CAR reference
 - (j) 6.3.5(1)(d) Data collection: added information regarding averaging of scores
 - (k) 6.3.6(1)(a) Variance effect analysis: clarified timeframe for review
 - (l) 6.3.7(1) Variance effect reporting: clarified start date

2.0 References and requirements

2.1 Reference documents

- (1) Use the following reference materials in conjunction with this document:
- (a) Part VII, Divisions III, IV, and V; and Subpart 2, Division X of the *Canadian Aviation Regulations* — Commercial Air Services, published in the *Canada Gazette*, Part II Volume 152, No. 25 on 12 December 2018;
 - (b) Advisory Circular (AC) 700-046 — Fatigue Risk Management System Requirements; and
 - (c) Advisory Circular (AC) 700-047 — Flight Crew Member Fatigue Management – Prescriptive Regulations.

2.2 Cancelled documents

- (1) Not applicable.

- (2) The publication of a new issue of a document automatically renders any earlier issues of the same document null and void.

2.3 Definitions and abbreviations

- (1) The following **definitions** are used in this document:
- (a) **Adverse effect (of the variance):** An increase in the level of fatigue and/or decrease in the level of alertness of the flight crew members conducting a flight that is subject to an exemption, in comparison to the baseline level of fatigue/alertness established for the flight.
 - (b) **Alertness:** The extent to which a person is fully awake, aware, mentally responsive, and perceptive.
 - (c) **“Black hole” approach:** An approach to an aerodrome at night over featureless and unlit terrain where the only lights visible are the aerodrome lights.
 - (d) **Continuing exemption:** An ongoing exemption that allows an air operator to continue to vary from specific prescriptive provisions provided certain conditions are met.
 - (e) **Corrective actions:** Actions taken by an air operator to eliminate the cause(s) of an adverse effect of the variance on an ongoing basis.
 - (f) **Countermeasures:** Temporary actions that flight crew members can take as a defense in response to unexpected fatigue.
 - (g) **Duty:** Any task that a flight crew member is assigned by an air operator at a specific time, including but not limited to management, flight duty, administration, training, positioning, reserve, and standby (synonymous with hours of work).
 - (h) **Establish:** Create, develop, set up, and document.
 - (i) **Fatigue:** A physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, physical activity or any combination thereof, that may impair a flight crew member’s ability to safely operate an aircraft or perform safety-related duties.
 - (j) **Fatigue-related hazard:** A work-related source of potential fatigue that could cause a fatigue-related error and contribute to an aircraft incident or accident.
 - (k) **Fatigue modelling:** A method to predict an average level of flight crew member fatigue/alertness for a work schedule, based on scientific understanding of factors contributing to fatigue.
 - (l) **Fatigue risk:** The assessed likelihood and severity of the consequence(s) that could result from a fatigue-related error caused by a fatigue-related hazard.
 - (m) **Fatigue risk controls:** Actions taken by an air operator to prevent an adverse effect of the variance on an ongoing basis.
 - (n) **Fatigue risk management system:** A scientifically-based, data-driven system to identify, control and monitor fatigue risks in flight operations to ensure that flight crew members are performing at adequate levels of alertness, and that the control processes are audited for effectiveness and compliance.
 - (o) **Fatigue-related event:** An error, contravention, occurrence, incident, or accident related to an undesired action or inaction by a flight crew member who was probably in a fatigued state.
 - (p) **Implement:** Put into operation, consistently use, and carry out (what was established).

- (q) **Initial exemption:** An interim exemption that allows an air operator to temporarily vary from specific prescriptive provisions provided certain conditions are met.
 - (r) **Maintain:** Upkeep (what was implemented), update, and ensure effectiveness in achieving intended results.
 - (s) **Method:** A systematic way to collect and analyze data to identify fatigue-related hazards and risks.
 - (t) **Methodology:** A description of the methods used to identify, analyze, and evaluate fatigue-related hazards and risks.
 - (u) **Mitigation measures:** Actions taken by an air operator to remedy an adverse effect of the variance on an ongoing basis.
 - (v) **Plain language:** Writing at a Grade 12 level that is clear, concise, and designed to be understandable to the intended audience.
 - (w) **Prescriptive requirements:** The flight and duty time limitations and rest period requirements contained in Part VII, Divisions III and IV; and Subpart 2 Division X of the *Canadian Aviation Regulations*. Exemptions are possible from specific prescriptive provisions in CAR 700.27 to 700.72, 700.103 to 700.135 and 702.92 to 702.98, except: 700.27(1)(c), 700.29(1)(a), 700.36, 700.37, 700.103(1)(e) and 702.92(1)(a)).
 - (x) **Preventive measures:** Actions taken by an air operator to prevent further recurrence of an adverse effect of the variance on an ongoing basis.
 - (y) **Regulatory requirements:** The *Canadian Aviation Regulations* and standards.
 - (z) **Safety case:** An air operator's structured written argument, validated by scientific and operational evidence, to justify that the variance from specific prescriptive provisions described in the notice of intent does not increase the level of fatigue or decrease the level of alertness of the flight crew members and that the fatigue risks associated with the flight are safely managed.
 - (aa) **Safety performance indicator:** A data-based parameter used for monitoring and assessing safety performance and fatigue risk control effectiveness.
 - (bb) **Scientific studies:** Original systematic research relating to fatigue and human performance that has been tested for validity through scientific method and has been published in a reputable, peer-reviewed scientific journal or by an accredited body.
 - (cc) **Unforeseen operational circumstances:** An event, such as unforecasted adverse weather, an equipment malfunction, or air traffic control delay, which is beyond the control of an air operator.
 - (dd) **Variance:** A deviation from specific prescriptive provisions permitted by an initial or continuing exemption.
 - (ee) **Work schedule:** Planned hours of work within a defined period of time.
 - (ff) **Year-round:** A flight that is conducted throughout the year.
- (2) The following **abbreviations** are used in this document:
- (a) **AC:** Advisory Circular
 - (b) **CAR:** *Canadian Aviation Regulations*
 - (c) **FCM:** Flight crew member
 - (d) **FDP:** Flight Duty Period
 - (e) **FRMS:** Fatigue Risk Management System

- (f) **LOC:** Letter of Confirmation
- (g) **NOI:** Notice of Intent
- (h) **POI:** TCCA Principal Operations Inspector
- (i) **SPI:** Safety Performance Indicator
- (j) **TCCA:** Transport Canada Civil Aviation
- (k) **UOC:** Unforeseen Operational Circumstances

3.0 Background

- (1) Updated requirements for managing flight crew fatigue were published in the *Canada Gazette*, Part II on 12 December 2018. The Regulation contains two compliance regimes:
 - (a) Prescriptive requirements that define maximum number of hours of flight and duty time, and minimum periods of rest and time free from duty; and
 - (b) Performance-based requirements that allow an air operator to vary from specific prescriptive provisions to conduct a flight using an FRMS to ensure that the variance will not adversely affect the levels of FCM fatigue and alertness.

4.0 Applicability

- (1) Upon coming into force, the FRMS provisions in Part VII, Division V are available to all air operators regulated under Part VII of the CARs, including those conducting medical evacuation flights. The in force dates for all CARs Part VII operating rules are available on TCCA's [Fatigue risk management in aviation](#) webpage, in the section [Applying the new regulations](#).
- (2) FRMS is intended as a way to manage flight crew fatigue and alertness more effectively than the prescriptive requirements. FRMS implementation is mandatory only when an air operator wishes to use an exemption from specific prescriptive provisions to conduct a flight. Each air operator must decide if the costs to develop and implement an effective FRMS and safety case(s) are worth the benefits of an exemption from specific prescriptive provisions.

Note: Information for developing an FRMS can be found in AC 700-046 (Fatigue Risk Management System Requirements).

5.0 FRMS regulatory requirements

- (1) The FRMS provisions in Part VII, Division V of the CARs contain a mechanism for an air operator to vary from specific prescriptive provisions to conduct a flight using an exemption supported by a safety case which demonstrates that the variance will not adversely affect the levels of FCM fatigue and alertness.
- (2) Under FRMS, exemptions are possible from any of the prescriptive provisions in CAR 700.27 to 700.72, 700.103 to 700.135 and 702.92 to 702.98 except the following provisions:
 - (a) CAR 700.27(1)(c) – maximum annual flight time;
 - (b) CAR 700.29(1)(a) – maximum annual number of hours of work;
 - (c) CAR 700.36 – designation of home base;
 - (d) CAR 700.37 – nutrition break;
 - (e) CAR 700.103(1)(e) – maximum annual flight time–medical evacuation flights; and

- (f) CAR 702.92(1)(a) – maximum annual flight time.

6.0 FRMS exemption and safety case process

- (1) Review your flight operations to determine the extent to which they can be conducted or adapted to operate within the prescriptive requirements. If any flight will need to use an exemption from specific prescriptive provisions, follow the sections below.
- (2) In accordance with CAR 700.201, reference to a “flight” in the FRMS provisions:
 - (a) Is not limited to:
 - (i) One take-off and landing;
 - (ii) One sector; or
 - (iii) One FDP;
 - (b) Includes a series of consecutive flights:
 - (i) Conducted by the same FCMs;
 - (ii) During a single FDP or consecutive FDPs;
 - (A) e.g. a pairing, or flights within a defined period.

6.1 Fatigue risk management plan and process

- (1) Review the FRMS requirements in CAR 700.200 to 700.259, as well as AC 700-046 for an explanation of the FRMS provisions.
- (2) For CAR 700.200(1)(b) or 700.200(2)(b), 700.214(1)(a) and (b), 700.215, and 700.216, establish and implement the following FRMS components:
 - (a) Fatigue risk management plan; and
 - (b) Fatigue risk management process.
 - (i) For CAR 700.217, collaborate with your employees in developing your internal fatigue reporting policy and procedure.

Note: These FRMS components need to be in operation and working as intended before submitting an NOI to use an initial exemption, in order to establish and validate a safety case according to CAR 700.225.

- (3) TCCA will review the FRMS documentation for compliance with the regulations, and to understand the established processes and procedures in support of the safety case decision. This review may take place:
 - (a) Prior to submission of an NOI – if feedback that the proposed documentation is complete is desired by the operator. This would allow time to address any TCCA feedback and avoid possible delays to the planned start date of the variance flight.
 - (b) With the NOI submission – although there is no regulatory requirement to submit documentation with the NOI, to do so is likely to expedite the NOI review process.
 - (c) When requested by TCCA - this may occur during or after the NOI review process.

6.2 Notice of Intent

- (1) For CAR 700.200(1)(a) or (2)(a), prepare a NOI for each exemption needed. Use the format in Appendix A to ensure your NOI contains all the information required by CAR 700.206. The NOI needs to be detailed and specific in order to provide a complete explanation to TCCA of:
- (a) The nature and scope of the variance from specific prescriptive provisions;
 - (b) The scientific basis for your variance premise; and
 - (c) How you will develop and validate the safety case.

6.2.1 Variance nature and scope

- (1) Description of Flight Subject to the Exemption - Consider all the prescriptive requirements that affect the **planned** work schedule for the FCMs who will conduct the flight (or series of flights if they meet CAR 700.201) that will be subject to the initial exemption. For CAR 700.206(1)(b), describe all of the following that apply:
- (a) Frequency that the flight will be conducted;
 - (b) Number and average duration of each flight within each FDP;
 - (c) Start and end times of the flight(s) as well as total flight time;
 - (d) Start and end times as well as the duration of each FDP;
 - (e) Duration of any part of an FDP that occurs within the FCMs' window of circadian low;
 - (f) Start and end times of any additional duty (assigned by an air operator) immediately following each FDP;
 - (g) Start and end times as well as the duration of each rest period before and after each FDP;
 - (h) Minimum duration of time free from duty before and after the series of consecutive FDPs;
 - (i) Number of consecutive FDPs;
 - (j) Aircraft type with which the flight will be conducted;
 - (k) Class of in-flight rest facility;
 - (l) Number of FCMs who will conduct the flight;
 - (m) Number of time zones the flight will cross and the direction of travel;
 - (n) Time zone in which the FCMs will be acclimatized at the start of the flight; and
 - (o) Any other information relevant to the flight's context in the work schedule of the FCMs who will conduct the flight.
- (2) CAR Provision(s) Exempted - For CAR 700.206(1)(c) and (d):
- (a) Identify the specific prescriptive provisions to which the initial exemption will apply; and
 - (b) Describe in detail how the flight varies from those prescriptive provisions.
 - (i) Include all aspects of the variance that will affect the prescriptive requirements. For example, a longer FDP or an increase in consecutive night duties may also affect requirements for rest periods and time free from duty.
- (3) For CAR 700.206(1)(f), identify:
- (a) The date when you expect to start conducting the flight under the initial exemption; and

- (b) Whether the flight will be conducted year-round.
 - (i) If the flight will not be conducted year-round, identify the period in each calendar year when you expect to conduct the flight.

Note: A safety case that will be proven in year-round conditions justifies the basis for a year-round continuing exemption, whereas a safety case for a flight not conducted year-round is proven only during the period of the year specified in the NOI, in compliance with CAR 700.206(1)(f), and therefore the continuing exemption will apply only for that period in each calendar year.

6.2.2 Scientific basis for variance

- (1) For CAR 700.206(1)(e):
 - (a) Identify the scientific studies which demonstrate that the variance is not likely to have an adverse effect on the levels of fatigue and alertness of the FCMs who will conduct the flight. Use the procedure you implemented for CAR 700.216(1)(d);
 - (b) Attach copies of the scientific studies to the NOI; and
 - (c) When these scientific studies provide fatigue management recommendations, apply these in developing your safety case.

6.2.3 Safety case description

- (1) For CAR 700.206(1)(g), describe in detail how you will develop the safety case, and include the following:
 - (a) The baseline level of FCM fatigue/alertness that was established for the flight;
 - (b) The predicted level of FCM fatigue/alertness associated with conducting the flight based on the variance;
 - (c) The result of the comparison of the variance level to the baseline level of FCM fatigue/alertness;
 - (d) The findings of the initial fatigue risk assessment and the fatigue risk controls that were implemented, before conducting the variance flight;
 - (e) The assumptions used for modelling of the work schedule associated with the flight:
 - (i) Average time needed upon waking for personal hygiene and nutrition;
 - (ii) Estimated time to and from the location where the FDP begins and ends (e.g. commute time, travel time to/from suitable accommodation, etc.);
 - (iii) Timing and estimated length of napping opportunities (e.g. pre-flight in suitable accommodation, in-flight in a Class 1, 2, or 3 rest facility);
 - (iv) Timing and estimated length of sleep opportunity prior to and / or after the FDP.
 - (f) The methods and procedures that will be used to identify fatigue-related hazards and risks;
 - (g) The methods and procedures that will be used to collect and analyze data to measure the effect of the variance on the levels of FCM fatigue and alertness;
 - (h) The method that will be used to determine the actual levels of fatigue and alertness of FCMs conducting the flight;

- (i) The method that will be used to compare the actual levels to the baseline level of FCM fatigue/alertness to determine the effect of the variance and whether the fatigue risk controls are working, including the fatigue and alertness data conversion method; and
- (j) The method that will be used to develop, implement and monitor mitigation measures and corrective actions to remedy on an ongoing basis any increases in the level of fatigue and decreases in the level of alertness of FCMs conducting the flight.

Note: It is acceptable for the operator to make a specific reference to their enterprise's FRMS documentation in lieu of detailing processes that are already documented, provided the documentation is submitted prior to or with the NOI.

6.2.4 More than one flight in one NOI

- (1) An NOI can include more than one flight if all the flights meet the requirements of CAR 700.206(2) and:
 - (a) Vary from the same prescriptive provision in the same manner, in order to comply with CAR 700.206(1)(c) and (d);
 - (b) Are conducted over the same period in each calendar year, in order to comply with CAR 700.206(1)(f); and
 - (c) Have the same predicted baseline level of FCM fatigue/alertness, in order for the safety case to comply with CAR 700.225(2)(d).
- (2) To include more than one flight in an NOI, provide all of the information required by CAR 700.206(1) and (2) as well as the following:
 - (a) Number of flights encompassed by the NOI;
 - (b) For CAR 700.206(2)(i), explain how the aircraft are similar in design, including similar level of automation and same class of in-flight rest facility if applicable. The purpose of this requirement is because aircraft differences can affect flight crew workload, which can impact FCM fatigue and alertness levels and have performance implications.
 - (i) For example, a B737-300 is not similar in level of automation to a B737 MAX.
 - (c) For CAR 700.206(2)(k), describe how the following factors are similar in the operating environment for all flights you include in one NOI:
 - (i) IFR vs. VFR operations;
 - (ii) Day vs. night operations (including "black hole" approaches);
 - (iii) Controlled vs. uncontrolled airspace and airports;
 - (iv) Airspace and airport complexity and traffic density;
 - (v) Presence vs. absence of approach aids;
 - (vi) Seasonal variations (e.g. weather and wind conditions, de-icing and low-visibility operations, time changes between Standard Time and Daylight Saving Time, onset of darkness), as such factors can affect flight duration and delays as well as FCM fatigue and alertness levels;
 - (vii) Take-offs/landings in hazardous terrain (e.g. mountainous, offshore, remote/ad hoc sites);
 - (viii) Flight crew workload;
 - (ix) Availability of flight crew support facilities (e.g. suitable accommodation, nutrition opportunities); and

- (x) Any other factors relevant to the operating environment of the flights.
- (d) For CAR 700.206(2)(l), use the fatigue risk assessment procedures you implemented for CAR 700.216(2) to determine whether the fatigue-related hazards and risks are similar for each of the flights you include in one NOI. Include in your NOI the risk level determined from each likelihood and severity evaluation.

Note: Fatigue risk evaluation is explained in 6.6.2 of AC 700-046.
- (3) When determining whether to include more than one flight in one NOI, consider:
 - (a) No exemption fee applies, regardless of whether more than one flight is included in one NOI or a separate NOI is used for each flight;
 - (b) Fatigue and alertness data pertaining to all flights conducted under the initial exemption must be collected for not less than one year to comply with CAR 700.225(3)(a), whether more than one flight is included in one NOI or a separate NOI is used for each flight;
 - (c) If fatigue and alertness data pertaining to one or more of the flights included in one NOI does not meet the requirements of CAR 700.225(3)(a):
 - (i) The safety case will not be validated and therefore will not be eligible for approval; and
 - (ii) All flights included in that NOI are not eligible for exemption from the same provision(s) for the period set out in CAR 700.246.
 - (d) If an NOI is used for one flight and its safety case is validated and approved, the continuing exemption may be applied to another flight if the requirements of CAR 700.240 are met.

6.2.5 NOI submission

- (1) Before conducting the flight, send your NOI to the POI assigned to your organization.
 - (a) TCCA will review the NOI to verify compliance with CAR 700.200 to 700.206. If any requirements are not met, TCCA will notify the air operator that the initial exemption is not in effect and the air operator must comply with the prescriptive requirements until the NOI is made compliant.
 - (b) Allowing at least 10 working days after the date of NOI submission to the planned start date of the variance flight is suggested, to avoid possible delays.
- (2) Correct the NOI to comply with regulatory requirements and send it back to your POI.
 - (a) When all the requirements of CAR 700.200 to 700.206 are met, TCCA will notify the air operator that the initial exemption is in effect.
- (3) For a flight that is not conducted year-round, the initial exemption applies to the period of each calendar year identified in the NOI in compliance with 700.206(1)(f).
- (4) Notify (in writing) your FCMs who will conduct the flight that the initial exemption is in effect.

6.2.6 Change in status of an NOI

- (1) Any change in the status of an NOI must be communicated in writing to the POI. This includes, e.g.:

- (a) Withdrawal of an NOI – which means an NOI that was submitted but for which a variance flight was never conducted under an initial exemption, and the operator chooses to retract their intent.
 - (i) Following withdrawal of an NOI, the operator can submit a (new) NOI at any time, and be exempt from the same provision and in respect of the same flight as the withdrawn NOI. The two year prohibition in CAR 700.246 does not apply.
- (b) Cancellation of an NOI – which means means an NOI for which an operator voluntarily ceases conducting a variance flight under an initial exemption.
 - (i) An NOI that has been cancelled by the operator and for which they have declared no further intent to pursue a safety case, is subject to the prohibition in CAR 700.246, whereby they are not eligible to be exempt from the same provision and in respect of the same flight for two years from the cancellation of the NOI.
- (c) Adjustment to an NOI – which means changes made to information provided in an existing NOI, such as the operating period or frequency of flight. This may result in a re-submission of the NOI.

6.3 Initial exemption and safety case

- (1) For CAR 700.225(1), establish a safety case for each initial exemption. The safety case applies the procedures implemented in your FRMS risk management process for CAR 700.216 to the flight that is subject to the exemption. Use the format in Appendix B to ensure your safety case contains all the information required by CAR 700.225.
- (2) The safety case needs to be detailed and methodical in order to demonstrate to TCCA that:
 - (a) There is a scientific basis for the premise, scope and effect of the variance from specific prescriptive provisions;
 - (b) Your assumptions regarding the flight's fatigue-related hazards, risks, controls and mitigation measures are not just a hunch; they are substantiated by comprehensive and relevant evidence;
 - (c) The fatigue risks associated with the flight are fully understood and safely managed; and
 - (d) Fatigue and alertness levels of the FCMs conducting the flight are not adversely affected by the variance from specific prescriptive provisions.

6.3.1 Variance nature and scope

- (1) Description of Flight Subject to the Exemption - Consider all the prescriptive requirements that affect the work schedule for the FCMs who conduct the flight (or series of flights if they meet CAR 700.201) that is subject to the exemption. For CAR 700.225(2)(a), describe all of the following that apply:
 - (a) Number of flights encompassed by the safety case;
 - (b) Frequency that the flight is conducted;
 - (c) Number and average duration of each flight within each FDP;
 - (d) Start and end times of the flight(s) as well as total flight time;
 - (e) Start and end times as well as the duration of each FDP;
 - (f) Duration of any part of an FDP that occurs within the FCMs' window of circadian low;

- (g) Start and end times of any additional duty (assigned by an air operator) immediately following each FDP;
 - (h) Start and end times as well as the duration of each rest period before and after each FDP;
 - (i) Minimum duration of time free from duty before and after the series of consecutive FDPs;
 - (j) Number of consecutive FDPs;
 - (k) Aircraft type with which the flight is conducted;
 - (l) Class of in-flight rest facility;
 - (m) Number of FCMs who conduct the flight;
 - (n) Number of time zones the flight crosses and the direction of travel;
 - (o) Time zone in which the FCMs are acclimatized at the start of the flight; and
 - (p) Any other information relevant to the flight's context in the work schedule of the FCMs who conduct the flight.
- (2) CAR Provision(s) Exempted - For CAR 700.225(2)(b) and (c):
- (a) Identify the specific prescriptive provisions to which the exemption applies; and
 - (b) Describe in detail how the flight that is subject to the exemption varies from those prescriptive provisions.
 - (i) Include all aspects of the variance that affect the prescriptive requirements. For example, a longer FDP or an increase in consecutive night duties may also affect requirements for rest periods and time free from duty.

6.3.2 Scientific basis for variance

- (1) For CAR 700.225(2)(f):
- (a) Identify the scientific studies which demonstrate that the variance is not likely to have an adverse effect on the levels of fatigue and alertness of the FCMs who conduct the flight;
 - (b) Attach copies of the scientific studies to the safety case; and
 - (c) If these scientific studies provide fatigue management recommendations which you did not apply, explain why.

6.3.3 Predicted variance effect

- (1) For CAR 700.225(2)(d), explain how you established the baseline level of FCM fatigue/alertness for the flight, and identified the fatigue-related hazards and risks. Include in the safety case the methodology and data used.
- (a) Use the fatigue modelling method you implemented for CAR 700.216(1)(f). Set threshold values to assess the results of scoring fatigue/alertness levels in work schedules. These thresholds may be recommended by the developer of your fatigue modelling system based on validation studies from prior application.
 - (i) Figure 1 shows example thresholds for a hypothetical fatigue modelling system with a score range of 1 to 100 (where the predicted level of alertness decreases/fatigue increases as the score goes up).

Figure 1

	Scores above 55 High Risk Unacceptable
	Scores 45-55 Moderate Risk Action Required
	Scores below 45 Low Risk Acceptable

- (b) Use your fatigue modelling method to score the predicted level of FCM fatigue/alertness for the work schedule associated with conducting the flight in compliance with all prescriptive requirements. For example, a flight with multiple sectors may need to factor in a crew change, split flight duty, or overnight stop. Take into account all of the duties performed in your operations by FCMs assigned to conduct the flight [CAR 700.214(2)].
- (i) If the result is within the Acceptable zone set for your fatigue modelling method, this becomes the baseline level of FCM fatigue/alertness for the flight.
 - (ii) If the result is not within the Acceptable zone set for your fatigue modelling method:
 - (A) Adjust the work schedule associated with the flight (e.g. increase length of rest periods, provide suitable accommodation before/after the flight, etc.) until the predicted level of FCM fatigue/alertness is within the Acceptable zone.
 - (B) The resulting score establishes the baseline level of FCM fatigue/alertness for the flight.

(Hereinafter referred to as 'baseline level'.)

Note: If an air operator identified fatigue-related hazards for a flight conducted before the FRMS regulations are in force, the air operator should provide that information with their safety case in support of the baseline level established for the flight. This information would relate to CAR 700.225(2)(d), not CAR 700.225(3)(a).

- (2) Use your fatigue modelling method to score the predicted level of FCM fatigue/alertness for the work schedule associated with conducting the flight based on the variance from specific prescriptive provisions. Take into account all of the duties performed in your operations by FCMs assigned to conduct the flight [CAR 700.214(2)].
 - (3) Compare the baseline level to the predicted level of FCM fatigue/alertness based on the variance from specific prescriptive provisions.
 - (4) Identify the causes of the fatigue-related hazards produced by the variance. Use the procedures you implemented for CAR 700.216(2)(a).
- Note:** Information on factors that are likely to cause FCM fatigue can be found in 6.6.1 of AC 700-046.
- (5) Include in the safety case:

- (a) An explanation of the justification for and a description of the assumptions used for modelling the work schedule associated with the flight, including all of the following that apply:
 - (i) Average time needed upon waking for personal hygiene and nutrition;
 - (ii) Estimated time to and from the location where the FDP begins and ends (e.g. commute time, travel time to/from suitable accommodation, etc.);
 - (iii) Frequency and length of scheduled breaks;
 - (iv) Time zone changes and estimated rate of acclimatization;
 - (v) Time of day variations in alertness from circadian rhythm effects;
 - (vi) Timing and estimated length of napping opportunities (e.g. pre-flight in suitable accommodation, in-flight in a Class 1, 2, or 3 rest facility);
 - (vii) Timing and estimated length of sleep opportunity, considering circadian sleep/wake influences;
 - (viii) Biological limits on recovery sleep; and
 - (ix) Any other assumptions used for modelling the work schedule associated with the flight.
- (b) The outputs produced from modelling the work schedule associated with the flight, including the outcomes of (1)(b), (2), and (3).

6.3.4 Fatigue risk assessment and risk controls

- (1) For CAR 700.225(3)(b), conduct a fatigue risk assessment of the fatigue-related hazards produced by the variance. Use the procedures you implemented for CAR 700.216(2)(b) and (c). Analyze the fatigue risk assessment findings, considering the risk context:
 - (a) When, during the work schedule associated with the flight, scores outside the Acceptable zone are predicted to occur;
 - (b) At those times, what the flight crew performance implications are (e.g. complexity of duty being performed and intensity of vigilance needed).
 - (i) For example, if fatigue/alertness levels outside the Acceptable zone are predicted only during positioning to home base to begin a period of time free from duty, the risk would be different than if those levels are predicted during critical phases of flight for each FDP in the work schedule associated with the flight.
- (2) For CAR 700.225(2)(h), document in the safety case the fatigue risk controls you implemented to address the risk assessment findings, before conducting the flight that is subject to the exemption.
 - (a) Using the procedures you implemented for CAR 700.216(2)(e), develop and apply fatigue risk controls to the work schedule associated with the flight in order to bring the predicted level of fatigue/alertness equivalent to or better than the baseline level.
 - (i) If there is no fatigue risk control that can achieve this, the air operator cannot use an exemption to conduct the flight because their fatigue risk management process is unable to address the findings of the fatigue risk assessment.
 - (b) Identify mitigation measures that can be implemented for the work schedule associated with the flight, if needed, to remedy any adverse effect of the variance on an ongoing basis.

- (c) The opportunity for FCMs to take controlled rest on the flight deck cannot be guaranteed; therefore it cannot be planned by an air operator as an ongoing fatigue risk control or mitigation measure to address the causes of the fatigue-related hazards produced by the variance.

Note: See explanation of CAR 700.72 and 700.135 in the context of 700.26 fitness for duty requirements in AC 700-047 (Flight Crew Member Fatigue Management - Prescriptive Regulations). See [Controlled Rest on the Flight Deck](#) (page 9 section 4.2) for explanation of use of controlled rest in response to unanticipated low levels of alertness, not as a mitigation for commencing duty when fatigued or as a substitute for effective fatigue risk controls to address the causes of the fatigue-related hazards produced by the variance.

- (3) Set SPIs to measure the effectiveness of the fatigue risk controls, using the procedure you implemented for CAR 700.216(2)(f). Focus these SPIs on proactive monitoring of actual levels of fatigue and alertness of the FCMs conducting the flight. The collection and analysis of this data will verify whether the fatigue risk control is working.

Note: Information on evaluating effectiveness of fatigue risk controls can be found in 6.6.5 of AC 700-046.

6.3.5 Data collection

- (1) For CAR 700.225(2)(e) and (i), explain how you collected data to measure the effect of the variance on the levels of fatigue and alertness of the FCMs conducting the flight that is subject to the exemption. Include in the safety case the methods and procedures used.

- (a) Align your fatigue and alertness testing methods to your fatigue modelling method so the scores from each will correlate. For example, a common fatigue scale, sleepiness scale or alertness scale may be used to convert testing results to inputs for retrospective analysis. Some fatigue modelling systems integrate this function to facilitate retrospective analysis.

Note: Information on fatigue or alertness scales integrated with seven fatigue modelling programs can be found on pages 35 to 48 of the [Biomathematical Fatigue Model Guidance Document \(icao.int\)](#)

- (b) Start conducting the flight that is subject to the exemption.
- (i) In accordance with CAR 602.02, 700.21, 700.218 and 700.255, assign FCMs to conduct the flight:
- (A) Whose work schedule enables them to be adequately rested and likely to be fit for all assigned duties associated with the flight/series of flights; and
- (B) Who have been trained for their FRMS responsibilities.

Note: This also applies when replacing any FCM who was previously assigned duties associated with the flight/series of flights.

- (c) Collect comprehensive fatigue and alertness data pertaining to each flight and the FCMs conducting the flight, using the procedures you implemented for CAR 700.216(1)(c) and 700.257(1).

Note: Guidance on data collection can be found in [Common Protocol for Minimum Data Collection Variables in Aviation Operations](#) and [Fatigue SPIs: A Key Component of Proactive Fatigue Hazard Identification](#). See [Controlled Rest on the Flight Deck](#) (page 15 section 4.9) for explanation of reporting use of controlled rest to enable evaluation of the effectiveness of fatigue risk controls on the work schedule associated with the flight.

- (d) Scores that result from fatigue and alertness data should not be averaged for a flight. Each FCM's score should be treated as a separate data point, and not be invalidated through averaging.
 - (i) Any score above the acceptable level for each type of fatigue / alertness test conducted is of concern. An individual with a fatigue level in excess of the upper threshold is not fit for duty and should not be conducting safety-sensitive tasks (flying, driving, etc.).
 - (ii) If a single value is required, take the worst of the FCM scores.
 - (iii) Consider in the analysis how many times fatigue scores are above the acceptable level, and over how much of the duration of the flight.

6.3.6 Variance effect analysis

- (1) For CAR 700.225(2)(g), document in the safety case your analysis of the effect of the variance on the levels of fatigue and alertness of the FCMs conducting the flight subject to the exemption. Include in the safety case **each** analysis done before the validated safety case is submitted for approval.
 - (a) Within the reporting intervals required by CAR 700.200(1)(c) or (2)(c), determine how often to analyze the variance effect using the procedures you implemented for CAR 700.216(1)(c) and (g). The frequency of variance effect analysis is expected to be commensurate with the flight frequency, fatigue risk, and results of FCM performance data collection, and be conducted within a timeframe such that it is available for review by the Minister every 90 days.
- (2) For **each** analysis of the variance effect:
 - (a) Compare planned and actual time worked for the FCMs conducting the flight that is subject to the exemption. Use the procedure you implemented for CAR 700.216(1)(g).
 - (i) Inputs include CAR 700.20(2) monitoring records, CAR 700.20(3) reports of UOC use, and CAR 700.21(2) FDP exceedances. For example, extending a FDP in the event of UOC may correlate to higher fatigue than predicted for the variance.
 - (b) Take into account in your analysis:
 - (i) For CAR 700.214(2), all of the duties performed in your operations by FCMs assigned to conduct the flight; and
 - (ii) For CAR 700.225(2)(g), the actual hours worked by those FCMs before and after the flight/series of flights subject to the exemption.
 - (A) For example, if those FCMs conduct flights under CAR 604 and CAR 704 and perform other duties such as deliver training, your analysis needs to take into account all those duties as well as the length of rest periods and time free from duty in their schedule before and after the flight/series of flights.
 - (B) The purpose of factoring in actual periods of work and rest by the FCMs before and after the flight/series of flights is to identify cumulative fatigue and its causes (e.g. consecutive duties; adequacy of breaks, rest opportunities, crew facilities and suitable accommodation).
 - (c) Use the fatigue and alertness data you collected to measure the effect of the variance on the FCMs (per 6.3.5) as inputs for retrospective data analysis.

Note: If FCMs used controlled rest on the flight deck during the flight that is subject to the exemption, their performance data after use of controlled rest should be

excluded because the results could imply higher alertness levels than can be assured for the variance on an ongoing basis.

- (i) Use your conversion method [per 6.3.5(1)(a)] to correlate the fatigue and alertness data results with your fatigue modelling predictions to determine the actual levels of FCM fatigue and alertness produced by the variance.
- (d) Compare the baseline level to the actual level of FCM fatigue/alertness, to determine the effect of the variance and whether the fatigue risk controls are working.

6.3.7 Variance effect reporting

- (1) For CAR 700.200(1)(c) or (2)(c), starting on the date on which the flight is first conducted under the exemption, and throughout the period that the initial exemption is in effect, notify your POI in writing every 90 days, or at the end of each period during which the flight is conducted if that period is shorter than 90 days, specifying:
 - (a) The outcome of each analysis of the variance effect on the levels of FCM fatigue and alertness; and
 - (b) The location where the analysis is available for TCCA review.

Note: TCCA will review these notices and inspect as necessary to verify progress in developing the safety case. In accordance with CAR 700.207, if the analysis does not show progress in developing the safety case, TCCA will notify the air operator that the exemption is not in effect and they must comply with the prescriptive requirements, including the specific prescriptive provisions from which they had been exempted.

6.3.8 Adverse effect correction and monitoring

- (1) For CAR 700.225(3)(c) and (d), upon each analysis of the variance effect, if there is an increase in the level of FCM fatigue or a decrease in the level of FCM alertness from the baseline level:
 - (a) Implement mitigation measures [e.g. identified per 6.3.4(2)(b)] to remedy the adverse effect of the variance; and
 - (b) Monitor the mitigation measures to determine their effect on the levels of FCM fatigue and alertness.

Note: Do this by repeating the actions in 6.3.5 and 6.3.6.

- (2) For CAR 700.225(3)(e) and (f), if the mitigation measures do not remedy the adverse effect of the variance on the fatigue and alertness of the FCMs conducting the flight:
 - (a) Re-evaluate the fatigue-related hazards produced by the variance;
 - (b) Take corrective actions; and
 - (c) Verify the effectiveness of the corrective actions in maintaining the levels of FCM fatigue and alertness at or better than the baseline level.

Note: Do this by repeating the actions in 6.3.4, 6.3.5 and 6.3.6.

- (3) For CAR 700.225(2)(j), document in the safety case each mitigation measure and corrective action taken to remedy **any** adverse effect of the variance.
- (4) If the fatigue risk controls, mitigation measures, and corrective actions are ineffective in remedying the adverse effects of the variance, the air operator cannot continue to use the exemption to conduct the flight and must comply with the prescriptive requirements.

6.3.9 Safety case validation

- (1) For CAR 700.225(3)(a), collect fatigue and alertness data pertaining to each time the flight is conducted during a validation period of not less than one year and not more than two years:
 - (a) Starting when the flight is first conducted under the initial exemption; and
 - (b) Ending before the initial exemption expires [i.e. the earlier of CAR 700.200(3) or 700.207].
- (2) Table 1 shows examples of how CAR 700.225(3)(a) applies to flights conducted year-round and flights conducted during a specified period each year.

Table 1

Flight frequency	Example	# of flights in 1-year period	Validation period		Outcome
			Year 1	Year 2	
Flights conducted <20 times in 1 year	Monthly flight operated year-round	12	All 12 flights +...	All subsequent flights UNTIL...	...not >1 of the 20 consecutive flights in the data set had an adverse effect of >5% over baseline level
	Arctic aerial survey flight operated every July	14	All 14 flights +...	All subsequent flights UNTIL...	
Flights conducted ≥20 times in 1 year	Daily flight operated year-round	365	All 365 flights +...	If necessary, all subsequent flights UNTIL...	
	Snowbird flight operated twice/week October - March inclusive	52	All 52 flights +...	If necessary, all subsequent flights UNTIL...	

- (3) At the end of the 1-2 year validation period, the final 20 consecutive flights in the data set have to show that:
- (a) Not more than 19 of those flights had an adverse effect up to but not greater than 5% over baseline level; and
 - (b) Not more than 1 of those flights had an adverse effect greater than 5% over baseline level.
 - (i) For example, if the baseline level has a score of 100, and you use a fatigue modelling method where a higher score reflects increased fatigue/decreased alertness, only 1 of the 20 consecutive flights in the data set at the end of the one-to-two year validation period can result in a score higher than 105.
 - (ii) As soon as a second flight of the 20 consecutive flights in the data set has an adverse effect greater than 5% over the baseline level, and the maximum two-year validation period has not ended:
 - (A) Repeat the actions in 6.3.8(2) and (3);
 - (B) Collect additional fatigue and alertness data in order to achieve the set of 20 consecutive flights; and
 - (C) Update your FRMS in accordance with CAR 700.214(3)(c).

Note: Any adverse effect of the variance must be remedied in the flights conducted throughout the one-to-two year validation period before the 20 consecutive flights in the data set [see 6.3.8(3)].

- (4) Include in the safety case:
 - (a) The fatigue and alertness data set from the one-to-two year validation period, to prove that CAR 700.225(3)(a) has been met; and
 - (b) The percentage of times the flight as conducted varied, by how much and why, from the description you provided in accordance with CAR 700.225(2)(c):
 - (i) During the one-to-two year validation period; and
 - (ii) During the final 20 consecutive flights of the data set.

Note: If the data collection to validate a safety case is not completed within the time period required by CAR 700.225(3)(a), the air operator cannot continue to use the initial exemption and must comply with the prescriptive requirements, including the specific prescriptive provisions from which they had been exempted.

6.3.10 Conclusions and ongoing evaluation

- (1) State clear conclusions to the safety case, confirming:
 - (a) The safety case has been validated in compliance with CAR 700.225(3); and
 - (b) The fatigue risk controls, mitigation measures and corrective actions you implemented are effective in maintaining the levels of fatigue and alertness of the FCMs conducting the flight at or better than the baseline level.

Note: If a safety case is not validated, it is not eligible for submission to the Minister for approval in accordance with CAR 700.232.

- (2) For CAR 700.225(2)(e) and 700.248(2), include in the safety case the methodology and methods for how you will:
 - (a) Collect and analyze data from a representative number of flights conducted under the continuing exemption for each period of six months during which the flight operates;
 - (b) Ensure your methodology justifies that the sample size is representative of the population size; and
 - (c) Use this information to evaluate the safety case on an ongoing basis.

Note: Guidance on safety case monitoring and evaluation can be found in 6.7.

- (3) For CAR 700.225(2)(k), explain how you will monitor the effectiveness of the FRMS in managing the safety case.

Note: Guidance on FRMS effectiveness reviews can be found in 8.2 of AC 700-046.

6.4 Remaining FRMS components

- (1) For CAR 700.214(1)(c) and (d), 700.218, and 700.219, establish and implement the following FRMS components:
 - (a) Fatigue risk management promotion program; and
 - (b) Fatigue risk management system quality assurance program.

Note: This can be done while the safety case is being developed and validated.

6.5 Initial FRMS audit

- (1) For CAR 700.231, after the safety case is validated, conduct an initial audit to confirm whether the FRMS is fully implemented and functioning as intended. If there are findings:
 - (a) Determine the cause and contributing factors of the deficiencies;
 - (b) Implement preventive measures and corrective actions to address the findings;
 - (c) Assess their effectiveness; and
 - (d) Update your FRMS documentation to incorporate these actions [CAR 700.214(3)(b)].

Note: Per CAR 700.231(4), this step does not apply if the exemption and safety case process was completed for a previous variance and an audit has already verified that the FRMS is compliant.

6.6 Safety case submission and approval

- (1) For CAR 700.232, submit the completed safety case to your POI, when you are satisfied that the safety case:
 - (a) Has been validated, and the data collection and analysis provides evidence of this; and
 - (b) Contains the information required by CAR 700.225, using the format in Appendix B which confirms:
 - (i) The FRMS has been audited in accordance with CAR 700.231;
 - (ii) The FRMS meets the requirements of Subpart 700 Division V of the CARs; and
 - (iii) The variance does not have an adverse effect on the levels of fatigue and alertness of the FCMs conducting the flight that is subject to the exemption.

Note: TCCA will review the submission to verify compliance with CAR 700.225, 700.232 and 700.233. If any requirements are not met, TCCA will return the submission to the air operator.

- (2) Correct the submission to comply with regulatory requirements and send it back to your POI.

Note: TCCA will approve the safety case when it is compliant with CAR 700.225 and the submission is compliant with CAR 700.232 and 700.233 (if within three years of the date on which the air operator sent the compliant NOI to TCCA), and notify the air operator that the continuing exemption is in effect.

- (3) For CAR 700.234(1), the continuing exemption for a flight that is not conducted year-round applies to the period identified in the NOI in compliance with 700.206(1)(f).
 - (a) The exemption is limited to the period in each calendar year in which fatigue and alertness data was collected and the safety case was validated.
 - (b) If your operations change such that you need to conduct the flight at a different time of year, develop and validate a safety case to support operating the flight at that time of year.
- (4) Notify (in writing) your FCMs conducting the flight that the continuing exemption is in effect.

Note: If the safety case is not made compliant with CAR 700.225 and/or the submission is not compliant with CAR 700.232 and 700.233 within three years of the date on which the air operator sent the NOI to TCCA, TCCA will notify the air operator that the exemption is not in effect and they must comply with the prescriptive requirements, including the specific prescriptive provisions from which they had been exempted.

6.7 Continuing exemption and safety case monitoring

- (1) For CAR 700.234(2), 700.240(4) and 700.248, monitor the effectiveness of the approved safety case to ensure that the levels of FCM fatigue and alertness are not adversely affected by the ongoing variance from specific prescriptive provisions. Use the procedures you implemented for CAR 700.219(3).
 - (a) For each six-month period during which the flight is conducted under the continuing exemption, collect and analyze fatigue and alertness data pertaining to a representative number of those flights. Use the methodology you included in the approved safety case for CAR 700.225(2)(e) and 700.248(2).
 - (i) The six-month period starts when the flight is first conducted under the continuing exemption after the safety case is approved.
 - (ii) Select a representative number of the flights conducted in each six-month period. Sample size generators which explain considerations such as population size, confidence level, and margin of error can be found at:
<http://www.raosoft.com/samplesize.html>
<https://www.calculator.net/sample-size-calculator.html>
<https://www.surveysystem.com/sscalc.htm>
 - (iii) Population size is the number of times the flight is conducted in each six-month period. The generator produces the sample size, which is the number of those flights to select for data collection and analysis to monitor the effects of the variance.
 - (iv) For a flight that operates over a period of less than six months, collect and analyze fatigue and alertness data pertaining to a representative number of the flights conducted during the period when the flight operates.
 - (v) Table 2 shows an example for a flight that operates weekly for 12 weeks from June through August each year.

Table 2

Confidence Level	95%
Margin of Error	5%
Population Size	12
Sample Size	12 Note: The sample size generators in 6.7(1)(a)(ii) generated the same sample size using a confidence level of either 90% or 99%, due to the small population size.

- (b) For CAR 700.248(3), (4) and (5), if the variance has any adverse effect on the levels of FCM fatigue and alertness:
 - (i) Remedy the adverse effect of the variance within 60 days of identifying the adverse effect, for CAR 700.234(2)(c) and 700.240(4)(c);
 - (ii) Assess the effectiveness of the corrective actions;
 - (iii) Repeat the actions in (i) and (ii) if necessary until the adverse effect is remedied;
 - (iv) Modify the safety case to take the corrective actions into account; and

- (v) Notify your POI in writing of the safety case modification within 60 days after the modification is made.

Note: TCCA will review the changes to the safety case and inspect as necessary to verify that the modified safety case continues to comply with regulatory requirements. If any requirements are not met, TCCA will return the safety case to the air operator.

- (c) Correct the modified safety case to comply with regulatory requirements and send it back to your POI.

Note: If the modified safety case is not made compliant with regulatory requirements, TCCA will notify the air operator that the exemption is not in effect and they must comply with the prescriptive requirements, including the specific prescriptive provisions from which they had been exempted.

- (2) For CAR 700.234(2)(a) and 700.240(4)(a), maintain and continuously improve your FRMS as long as exemptions remain in effect.

- (a) Update the FRMS for any of the reasons set out in CAR 700.214(3) and 700.256(1).
- (b) For CAR 700.256(2), notify your POI in writing of the FRMS changes within 60 days after the change is made.

7.0 Time limitations

- (1) The time limits in CAR 700.200(3), 700.207, 700.225(3)(a), and 700.246 affect how long an air operator can use an initial exemption to validate a safety case and have it approved by TCCA:

- (a) CAR 700.200(3) and 700.207 – The initial exemption ends on the earliest of the following:
 - (i) Analysis of the effect of the variance on the levels of FCM fatigue and alertness does not show any progress in developing the safety case;
 - (ii) Three years after the air operator sent a compliant NOI to TCCA; or
 - (iii) The date the continuing exemption comes into effect.
- (b) CAR 700.225(3)(a) – Fatigue and alertness data collection to validate the safety case must be done for not less than one year and not more than two years after the flight was first conducted under the initial exemption.
- (c) CAR 700.246 – An air operator who has not submitted their validated safety case for approval within three years of sending a compliant NOI to TCCA cannot be exempted from the same provisions for the same flight(s) for two years afterwards. Table 3 shows an example situation.

Table 3

Date	Status
April 1, 2021	Air operator sends a compliant NOI to TCCA.
March 31, 2024	Air operator has not finished validating the safety case and had it approved by TCCA.
April 1, 2024	Air operator’s initial exemption expires.
April 1, 2026	Earliest date that air operator would be eligible to send TCCA an NOI to use an initial exemption from the same provision(s) for the same flight(s) in order to try again to validate a safety case.

- (2) The difference between the two-year maximum validation period and the three-year maximum initial exemption period allows for time between:
 - (a) Submitting the NOI and receiving TCCA's verification of NOI compliance, before starting to conduct the flight; and
 - (b) Submitting the validated safety case and receiving TC approval.

8.0 Conducting another flight under the same continuing exemption

- (1) Your approved safety case can be used as the basis to conduct another flight using the same continuing exemption if the other flight meets all the conditions of CAR 700.240 and:
 - (a) Varies from the same prescriptive provision in the same manner;
 - (b) Is conducted over the same period in each calendar year; and
 - (c) Has the same baseline level.

Note: An approved safety case that was proven in year-round conditions justified the basis for a year-round continuing exemption, whereas an approved safety case for a flight not conducted year-round was proven only during the period of the year that was specified in the NOI in compliance with CAR 700.206(1)(f) and therefore the continuing exemption applies only for that period in each calendar year.

8.1 Letter of confirmation requirements

- (1) For CAR 700.240(2), prepare a Letter of Confirmation (LOC). Use the format in Appendix C to ensure your LOC contains all the information required by CAR 700.240.
- (2) Consider all the prescriptive requirements that affect the planned work schedule for the FCMs who will conduct the other flight. For CAR 700.240(2)(a), describe all of the following that apply to the other flight you intend to conduct using the same continuing exemption:
 - (a) Frequency that the other flight will be conducted;
 - (b) Start and end times of the other flight as well as total flight time;
 - (c) Number and average duration of each flight within each FDP;
 - (d) Start and end times as well as the duration of each FDP;
 - (e) Number and duration of any part of an FDP that occurs within the FCMs' window of circadian low;
 - (f) Start and end times of any additional duty (assigned by an air operator) immediately following each FDP;
 - (g) Start and end times as well as the duration of each rest period before and after each FDP;
 - (h) Number of consecutive FDPs;
 - (i) Duration of time free from duty before and after the series of consecutive FDPs;
 - (j) Aircraft type with which the other flight will be conducted;
 - (k) Class of in-flight rest facility;
 - (l) Number of FCMs who will conduct the other flight;

- (m) Number of time zones the other flight will cross and the direction of travel;
 - (n) Time zone in which the FCMs will be acclimatized at the start of the other flight; and
 - (o) Any other information relevant to the other flight's context in the work schedule of the FCMs who will conduct the other flight.
- (3) For CAR 700.240(2)(b) and (c):
- (a) Identify the specific prescriptive provisions from which the other flight will vary; and
 - (b) Describe in detail how the other flight will vary from those prescriptive provisions.
- (4) For CAR 700.240(2)(e), identify:
- (a) The date when you expect to start conducting the other flight using the same continuing exemption; and
 - (b) Whether the other flight will be conducted year-round.
 - (i) If the other flight will not be conducted year-round, identify the period in each calendar year when you expect to conduct the other flight.
- (5) For CAR 700.240(2)(d), confirm that the other flight you intend to conduct using the same continuing exemption meets all the conditions in CAR 700.240(1). Provide the following information in your LOC:
- (a) Documentation of how the baseline level was established for the work schedule associated with the other flight you intend to conduct using the same continuing exemption.
 - (b) For CAR 700.240(1)(g), explain how the aircraft are similar in design, including similar level of automation and same class of in-flight rest facility if applicable. The purpose of this requirement is because aircraft differences can affect flight crew workload, which can impact FCM fatigue and alertness levels and have performance implications.
 - (i) For example, a B737-300 is not similar in level of automation to a B737 MAX.
 - (c) For CAR 700.240(1)(i), describe how the following factors are similar in the operating environment for the other flight you intend to conduct using the same continuing exemption:
 - (i) IFR vs. VFR operations;
 - (ii) Day vs. night operations (including "black hole" approaches);
 - (iii) Controlled vs. uncontrolled airspace and airports;
 - (iv) Airspace and airport complexity and traffic density;
 - (v) Presence vs. absence of approach aids;
 - (vi) Seasonal variations (e.g. weather and wind conditions, de-icing and low-visibility operations, time changes between Standard Time and Daylight Saving Time, onset of darkness), as such factors can affect flight duration and delays as well as FCM fatigue and alertness levels;
 - (vii) Take-offs/landings in hazardous terrain (e.g. mountainous, offshore, remote/ad hoc sites);
 - (viii) Flight crew workload;
 - (ix) Availability of flight crew support facilities (e.g. suitable accommodation, nutrition opportunities); and
 - (x) Any other factors relevant to the operating environment of the other flight.

- (d) For CAR 700.240(1)(j), use the fatigue risk assessment procedures you implemented for CAR 700.216(2) to determine whether the fatigue-related hazards and risks are similar for the other flight you intend to conduct using the same continuing exemption. Include in your LOC the risk level determined from each likelihood and severity evaluation.

Note: Fatigue risk evaluation is explained in 6.6.2 of AC 700-046.

8.2 LOC submission

- (1) Before conducting the other flight, send the LOC to your POI.

Note: TCCA will review the LOC and inspect as necessary to verify that the air operator is compliant with the requirements of CAR 700.240. If any requirements are not met, TCCA will return the LOC to the air operator.

- (2) Correct the LOC to comply with regulatory requirements and send it back to your POI.

Note: When all the requirements of CAR 700.240 are met, TCCA will notify the air operator that the continuing exemption is in effect for the other flight.

- (3) Notify (in writing) your FCMs who will conduct the other flight that the continuing exemption is in effect for that flight.

- (4) For CAR 700.240(4) and 700.248, follow 6.7 to ensure the effectiveness of the approved safety case in managing the fatigue and alertness levels of FCMs conducting the other flight using the same continuing exemption.

Note: If the LOC is not made compliant with CAR 700.240 or the other flight does not meet the requirements of CAR 700.240, TCCA will notify the air operator that they cannot use the continuing exemption for the other flight and that other flight must comply with the prescriptive requirements.

9.0 TCCA oversight

- (1) TCCA will inspect FRMS compliance during surveillance activities. At any time during and after the FRMS exemption process explained in this AC, TCCA may:

- (a) Review your FRMS, notice(s) of intent, safety case(s), letter(s) of confirmation, and any related data, documentation and FRMS outputs;
- (b) Identify non-compliance and require corrective actions to comply with regulatory requirements; and
- (c) Verify that these actions have taken place.

- (2) For CAR 700.259, upon request make available to TCCA your FRMS documentation and all related records and outputs of the FRMS. This will usually be reviewed during TCCA's surveillance activities.

10.0 Information management

- (1) Not applicable.

11.0 Document history

- (1) Advisory Circular (AC) 700-045 Issue 01, RDIMS 12589289 (E), 13038934 (F), dated 2017-07-21 — Fatigue Risk Management System Implementation Procedures.

- (2) Advisory Circular (AC) 700-045 Issue 02, RDIMS 14424725 (E), 14628023 (F), dated 2020-12-12
– Exemption and Safety Case Process for Fatigue Risk Management Systems

12.0 Contact us

For more information, please contact:

Commercial Flight Standards Division (AARTF)

E-mail: TC.FCFM-GFEC.TC@tc.gc.ca

We invite suggestions for amendment to this document. Submit your comments to:

Standards Branch Documentation Services

E-mail: AARTDocServices-ServicesdocAART@tc.gc.ca

Original signed by

Félix Meunier

Director, Standards Branch

Civil Aviation, Transport Canada

Appendix A – Notice of intent format

Date: _____ [day/month/year]

To the attention of: _____ [name of TCCA principal operations inspector]

Transport Canada Civil Aviation
_____ [address of office where POI is located]

Subject: Notice of Intent pursuant to *Canadian Aviation Regulations (CAR) 700.206*

This Notice of Intent (NOI) notifies Transport Canada that _____ [legal name of air operator] intends to conduct a flight using an initial exemption as provided in CAR 700.200 to vary from specific flight, duty and/or rest period provisions identified in this NOI.

In accordance with CAR 700.206, this NOI sets out the following:

1. Commitment statement for the FRMS [CAR 700.206(1)(a)]:

This NOI confirms that _____ [legal name of air operator]:

- a. Has established, implemented and is maintaining the fatigue risk management plan and fatigue risk management process required by CAR 700.215 to 700.217; and
- b. Commits to establish, implement and maintain a program for fatigue risk management promotion and a quality assurance program for the FRMS in accordance with CAR 700.218, 700.219 and 700.214(3) before submitting the safety case described in Section 7 below to Transport Canada for approval.

2. Description of flight subject to the initial exemption [CAR 700.206(1)(b)]:

Following is a detailed description of the flight and its context in the work schedule of the flight crew members (FCM) who will conduct the flight using the initial exemption:

_____ [see 6.2.1(1) of this AC]

[And if more than one flight is encompassed by the NOI]: Following is a detailed description of how each flight described above meets each of the requirements in CAR 700.206(2):

_____ [see 6.2.4(2) of this AC]

[If more than one flight is encompassed by the NOI]: Attached to this NOI is documentation of the risk level determined from evaluation of the fatigue-related hazards and risks associated with each flight described above.

3. CAR provision(s) from which an initial exemption will be used [CAR 700.206(1)(c)]:

Listed below are the provision(s) in CAR 700.27 to 700.72 or 700.101 to 700.135 or 702.92 to 702.98 from which an initial exemption will be used to conduct the flight(s) while the safety case is validated:

_____ [see 6.2.1(2) of this AC]

[If more than one flight is encompassed by the NOI]: _____ [legal name of air operator] confirms that the provision(s) listed above are the same for all the flights that will be conducted using the same initial exemption.

4. Description of the variance [CAR 700.206(1)(d)]:

Following is a detailed description of how the flight(s) subject to the initial exemption varies from the requirements of the identified affected provision(s):

_____ [see 6.2.1(2) of this AC]

[If more than one flight is encompassed by the NOI]: _____ [legal name of air operator] confirms that the variance described above is the same for all the flights that will be conducted using the same initial exemption.

5. Scientific basis for the variance [CAR 700.206(1)(e)]:

Listed below are the scientific studies which demonstrate that the described variance is not likely to have an adverse effect on the levels of fatigue and alertness of the FCMs who conduct the flight(s) described in Section 2:

_____ [see 6.2.2(1) of this AC]

Attached to this NOI are copies of the scientific studies listed above.

6. Expected start date/period of flight subject to the initial exemption [CAR 700.206(1)(f)]:

[For a flight that is conducted year-round]: The expected date on which the flight(s) described in Section 2 will first be conducted is _____ [day/month/year].

[For a flight that is not conducted year-round]: The expected period in each calendar year during which the initial exemption will apply to the flight(s) described in Section 2 begins on _____ [day/month/year] and ends on _____ [day/month/year]. [See 6.2.1(3) of this AC]

[If more than one flight is encompassed by the NOI]: _____ [legal name of air operator] confirms that all the flights conducted using the same initial exemption operate over the same period in each calendar year.

Starting on the date on which the first flight is conducted under the initial exemption until the initial exemption no longer applies, _____ [legal name of air operator] commits to notify Transport Canada at the frequency set out in CAR 700.200(1)(c) or (2)(c) that an analysis of the variance effect on the levels of FCM fatigue and alertness is ready for review.

_____ [see 6.3.7 of this AC]

Appendix B – Safety case format

Date: _____ [day/month/year]

To the attention of: _____ [name of TCCA principal operations inspector]

Transport Canada Civil Aviation
_____ [address of office where POI is located]

Subject: Safety case submission pursuant to *Canadian Aviation Regulations* (CAR) 700.225 and 700.232

This submission notifies Transport Canada that _____ [legal name of air operator] established and validated a safety case using an initial exemption provided in CAR 700.200 to conduct the flight described in the Notice of Intent (NOI) dated _____ [day/ month/year], in order to demonstrate that the variance described in that NOI does not increase the level of fatigue or decrease the level of alertness of the flight crew members (FCM) conducting the flight.

In accordance with CAR 700.225 and 700.232, this submission sets out the following:

1. Commitment statement for FRMS compliance [CAR 700.232]

_____ [legal name of air operator] confirms:

- a. The initial audit of our organization's FRMS has been conducted in compliance with CAR 700.231; and
- b. Our FRMS meets the requirements of CAR 700 Division V.

2. Variance nature and scope

2.1 Description of flight subject to the exemption [CAR 700.225(2)(a)]:

Following is a detailed description of the flight and its context in the work schedule of the FCMs conducting the flight using the exemption:

_____ [see 6.3.1(1) of this AC]

[And if more than one flight is encompassed by the NOI and safety case]: Following is a detailed description of how each flight described above meets each of the requirements in CAR 700.206(2):

_____ [this information should be the same as provided in the NOI - see 6.2.4(2) of this AC]

2.2 CAR provision(s) exempted [CAR 700.225(2)(b)]:

Listed below are the provision(s) in CAR 700.27 to 700.72 or 700.101 to 700.135 or 702.92 to 702.98 from which the continuing exemption will be used to conduct the flight(s) described in Section 2.1:

CAR 70_____
_____ etc.

[If more than one flight is encompassed by the NOI and safety case]: _____ [legal name of air operator] confirms that the provision(s) listed above are the same for all the flights conducted using the same exemption, in compliance with CAR 700.234(1).

2.3 Description of the variance [CAR 700.225(2)(c)]:

Following is a detailed description of how the flight(s) described in Section 2.1 varies from the requirements of the provision(s) listed in Section 2.2:

_____ [see 6.3.1(2) of this AC]

[If more than one flight is encompassed by the NOI and safety case]: _____ [legal name of air operator] confirms that the variance described above is the same for all the flights conducted using the same exemption.

3. Scientific basis for the variance [CAR 700.225(2)(f)]

Listed below are the scientific studies which demonstrate that the variance described in Section 2.3 is not likely to have an adverse effect on the levels of fatigue and alertness of the FCMs conducting the flight(s) described in Section 2.1:

_____ [see 6.3.2(1) of this AC]
_____ etc.

Attached are copies of the scientific studies listed above.

4. Predicted variance effect

4.1 Baseline level of FCM fatigue/alertness [CAR 700.225(2)(d)]:

Following is a description of the methods our organization used to establish the baseline level for the flight and to identify fatigue-related hazards produced by the variance described in Section 2.3:

_____ [see 6.3.3(1) of this AC]

Attached are:

- a. The supporting data required by CAR 700.225(2)(d); and
- b. Fatigue modelling outputs documenting the baseline level established for the work schedule associated with conducting the flight(s) in compliance with all prescriptive requirements.

[If more than one flight is encompassed by the NOI and safety case]: _____ [legal name of air operator] confirms that the baseline level is the same for all the flights conducted using the same exemption.

4.2 Variance level of FCM fatigue/alertness

Attached are fatigue modelling outputs documenting the predicted level of FCM fatigue/alertness for the work schedule associated with conducting the flight(s) based on the variance described in Section 2.3. [See 6.3.3(2) of this AC]

4.3 Comparison of variance level to baseline level

Following is the outcome of comparing the results described in Sections 4.1 and 4.2:

_____ [see 6.3.3(3) of this AC]

Listed below are the causes of each fatigue-related hazard produced by the variance described in Section 2.3:

_____ etc.

5. Fatigue risk assessment and risk controls [CAR 700.225(2)(h)]

In compliance with CAR 700.225(3)(b), attached are:

- a. Risk assessment(s) of the fatigue-related hazards produced by the variance described in Section 2.3; and
- b. Our organization's analysis of the findings of the fatigue risk assessment.

Listed below are the fatigue risk controls our organization implemented to address the findings of the fatigue risk assessment:

_____ [see 6.3.4 of this AC]
_____ etc.

6. Data collection [CAR 700.225(2)(e) and (i)]

Attached are the methods and procedures our organization used to collect data to measure the effect of the variance described in Section 2.3 on the levels of fatigue and alertness of the FCMs conducting the flight(s) described in Section 2.1. [See 6.3.5 of this AC]

7. Variance effect analysis [CAR 700.225(2)(g)]

Attached is each analysis our organization performed of the effects of the variance on the levels of fatigue and alertness of the FCMs conducting the flight(s) described in Section 2.1. [See 6.3.6 of this AC]

8. Adverse effect correction and monitoring [CAR 700.225(2)(j)]

Listed below are all the mitigation measures and corrective actions our organization implemented to remedy on an ongoing basis any increase in the level of fatigue and decrease in the level of alertness of the FCMs conducting the flight(s) described in Section 2.1:

_____ [see 6.3.8 of this AC]
_____ etc.

9. Safety case validation [CAR 700.225(3)(a)]

Attached are [see 6.3.9 of this AC]:

- a. All fatigue and alertness data collected pertaining to each time the flight was conducted during a period of not less than one year and not more than two years, starting when the flight was first conducted under the initial exemption; and

- b. Analysis of the percentage of times the flight as conducted varied from the variance described in Section 2.3:
- i. During the one-to-two year validation period; and
 - ii. During the final 20 consecutive flights in the data set.

_____ [legal name of air operator] confirms that this data shows that not more than 5% of the 20 consecutive flights in the data set at the end of the one-to-two year validation period had an adverse effect greater than 5% over the baseline level.

10. Conclusions

_____ [legal name of air operator] confirms:

- a. This safety case has been validated in compliance with CAR 700.225(3); and
- b. The fatigue risk controls, mitigation measures and corrective actions our organization implemented are effective in maintaining the levels of fatigue and alertness of the FCMs conducting the flight(s) described in Section 2.1 equivalent to or better than the baseline level established in accordance with Section 4.1.

11. Ongoing evaluation [CAR 700.225(2)(e) and (k), 700.248(2)]

Following is a description of the methods that our organization will use on an ongoing basis to collect and analyze data from a representative number of the flights described in Section 2.1 over each period of six months during which the flight is conducted, and to evaluate this safety case:

_____ [see 6.3.10(2) of this AC]
_____ etc.

Following is a description of how our organization will monitor the effectiveness of the FRMS in managing this safety case:

_____ [see 6.3.10(3) of this AC]

12. Commitment statement for continuing exemption [CAR 700.234(2)]:

_____ [legal name of air operator] confirms the following:

- a. In compliance with CAR 700.234(2)(a), our organization continues to maintain the FRMS in accordance with CAR 700.200 to 700.259;
- b. In compliance with CAR 700.234(2)(b), our organization continues to monitor the effectiveness of the safety case in managing the fatigue and alertness levels of FCMs conducting the flight(s) using the exemption; and
- c. In compliance with CAR 700.234(2)(c), our organization will remedy any adverse effects of the variance on the fatigue and alertness levels of FCMs conducting the flight(s) using the exemption, no later than 60 days after the date on which the adverse effect is identified.

13. Submission of safety case for approval [CAR 700.232]

_____ [legal name of air operator] submits this validated safety case to Transport Canada for approval.

On receipt of Transport Canada's approval of the safety case, _____ [legal name of air operator] intends to conduct the flight(s) described in Section 2.1 using a continuing exemption in compliance with CAR 700.234 to vary from the provisions identified in Section 2.2.

Signed by the Accountable Executive for _____ [legal name of air operator]:

Name Signature Title Date

Air Operator address

Certificate Number: _____

Attachments

Appendix C – Letter of Confirmation format

Date: _____ [day/month/year]

To the attention of: _____ [name of TCCA principal operations inspector]

Transport Canada Civil Aviation
_____ [address of office where POI is located]

Subject: Letter of Confirmation pursuant to *Canadian Aviation Regulation (CAR) 700.240*

This Letter of Confirmation (LOC) notifies Transport Canada that _____ [legal name of air operator] intends to conduct another flight that meets the conditions of CAR 700.240 using the same continuing exemption from the specific flight, duty and/or rest period provisions identified in our organization's safety case approved by Transport Canada on _____ [day/ month/year].

In accordance with CAR 700.240, this LOC sets out the following:

1. Description of other flight subject to the same exemption [CAR 700.240(2)(a)]:

Following is a detailed description of the other flight and its context in the work schedule of the flight crew members (FCM) who will conduct the other flight using the same continuing exemption on the basis of the approved safety case:

_____ [see 8.1(2) of this AC]
_____ etc.

2. CAR provision(s) exempted [CAR 700.240(2)(b)]:

Listed below are the provision(s) in CAR 700.27 to 700.72 or 700.101 to 700.135 or 702.92 to 702.98 from which the same continuing exemption will be used to conduct the other flight described in Section 1:

CAR 70_____
_____ etc.

_____ [legal name of air operator] confirms that the provision(s) listed above are the same for all the flights conducted using the same continuing exemption, in compliance with CAR 700.240(3)(a).

3. Description of the variance [CAR 700.240(2)(c)]:

Following is a detailed description of how the other flight described in Section 1 varies from the requirements of the provision(s) listed in Section 2:

_____ [see 8.1(3) of this AC]

_____ [legal name of air operator] confirms that the variance described above is the same for all the flights conducted using the same continuing exemption, in compliance with CAR 700.240(3)(b).

4. Commitment statement for other flight subject to the same exemption [CAR 700.240(2)(d)]

Following is a detailed description of how the other flight described in Section 1 meets each of the requirements in CAR 700.240(1)(b) to (m):

_____ [see 8.1(5) of this AC]
_____ etc.

_____ [legal name of air operator] confirms that:

- a. The other flight described in Section 1 meets all the conditions in CAR 700.240(1)(a) to (m); and
- b. The baseline level is the same for all the flights conducted using the same continuing exemption.

Attached to this LOC is documentation of:

- a. How the baseline level was established for the work schedule associated with the other flight described in Section 1; and
- b. The risk level determined from evaluation of the fatigue-related hazards and risks associated with the other flight described in Section 1.

5. Start date/period of other flight subject to the same exemption [CAR 700.240(2)(e)]:

[For a flight that is conducted year-round]: The date on which the continuing exemption will apply to the other flight described in Section 1 for the first time is _____ [day/month/year].

[For a flight that is not conducted year-round]: The period during which the continuing exemption will apply to the other flight described in Section 1 begins on _____ [day/month/year] and ends on _____ [day/month/year]. [See 8.1(4) of this AC]

_____ [legal name of air operator] confirms that all the flights conducted using the same continuing exemption operate over the same period in each calendar year.

6. Commitment statement for continuing exemption [CAR 700.240(4)]:

_____ [legal name of air operator] confirms the following:

- a. In compliance with CAR 700.240(4)(a), our organization continues to maintain the FRMS in accordance with CAR 700.200 to 700.259;
- b. In compliance with CAR 700.240(4)(b), our organization will continue to monitor the effectiveness of the approved safety case in managing the fatigue and alertness levels of FCMs conducting the other flight described in Section 1; and
- c. In compliance with CAR 700.240(4)(c), our organization will remedy any adverse effects of the variance on the fatigue and alertness levels of FCMs conducting the other flight described in Section 1, no later than 60 days after the date on which the adverse effect is identified.

Signed by the Accountable Executive for _____ [legal name of air operator]:

Name Signature Title Date

Air Operator address

Certificate Number: _____

Attachments