Fatigue Risk Management

Transport Canada Civil Aviation's Approach

What we will cover

- TCCA's fatigue management approach
- Implementation timeframes
- FRMS requirements
- Exemption and safety case process
- Implementation initiatives and resources

TCCA's Fatigue Management Approach

- Fatigue management regulations:
  - Flight, duty & rest rules
    - Airlines (705) must also manage fatigue risks through SMS
  - FRMS rules
    - Mandatory to vary from specific flight, duty & rest provisions
    - Exemption scheme is built into the FRMS regulations
- Comparison with ICAO SARPs:
  - Fatigue management rules apply to air operators and flight crew
    - Not cabin crew, ATC, or aircraft maintenance
  - Approval of FRMS safety cases
    - Not FRMS manual approval

What is a Safety Case?

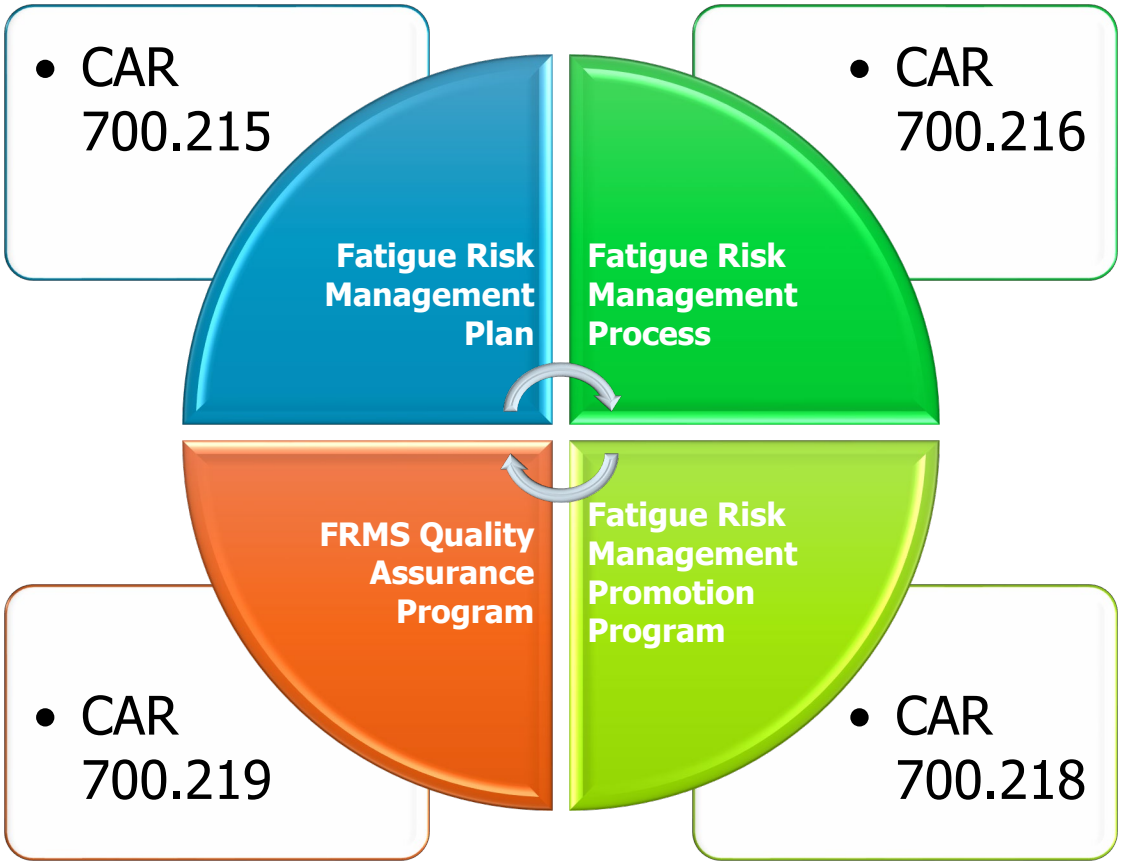
- Safety cases are products of an operator's FRMS
  - Outputs of the operator's FRMS processes…

    …are inputs to their safety case for each exemption from flight, duty or rest requirements
- A validated safety case demonstrates that:
  - Fatigue risks of a flight operated under an exemption from prescriptive limits can be safely managed
  - Variance does not increase level of fatigue or decrease level of alertness of FCMs conducting the flight

Who is affected When?

- New flight, duty & rest rules will apply to commercial air transport services *(passenger and cargo):*
  - Airline operators (705) – Dec. 2020
  - Commuter and air taxi operators (704, 703) – Dec. 2022
- Existing flight, duty & rest rules will continue to apply to:
  - Medical evacuation flights
  - Private business aviation (604)
  - Aerial work (702)
- FRMS will apply to 702, 703, 704, 705 operators:
  - 702, 705 – Dec. 2020
  - 703, 704 – Dec. 2022
  - Medevacs – Operating rule determines effective date

4 FRMS Components



Component 1
Fatigue Risk Management Plan

Purpose:

Explain how your FRMS works, who is responsible for it, and how it will be monitored and measured

Fatigue Risk Management Policy

Identify the scope, purpose, and objectives of your FRMS

1

Safety Objectives

Define what your organization plans to achieve with FRMS (state the desired outcomes)

2

Safety Indicators

Identify individual measures to monitor FRMS performance and the effectiveness of risk mitigations

3

Fatigue Management Responsibilities

Define the responsibilities of management, persons managing the FRMS, and flight crew

4

Training Plan

Design a training plan which includes initial and annual training

5

Communication Plan

Design a plan for communicating fatigue-related information to flight crew members

6

Internal Fatigue Reporting Policy

Develop a policy for internal reporting of fatigue without fear of reprisal

7

Component 2
Fatigue Risk Management Process

Purpose:

Identify, assess, and control fatigue risks in your operations. Use reactive, proactive, and predictive data to monitor and manage fatigue risks

Internal Fatigue Reporting Procedure

Design a procedure for flight crew members to report fatigue, fatigue hazards, and fatigue-related events

1

Procedure to identify fatigue-related hazards

Design a procedure for collecting information to identify fatigue hazards and their causes

2

Safety data & scientific studies used to support FRMS

Develop a list of scientific studies & safety data used to design & update your FRMS

3

Fatigue data & information management procedure

Design a procedure to manage fatigue data and information

4

Procedure for fatigue modelling of flight crew schedules

Design a procedure for modelling schedules to identify and reduce fatigue likelihood

5

Procedure to analyze planned vs. actual schedules

Design a procedure to determine whether fatigue is being effectively managed

6

Fatigue risk assessment process

Design a process to determine & control risks of fatigue hazards

7

Component 3
Fatigue Risk Management Promotion Program

Purpose:

Promote fatigue risk management through competency-based training and communicating fatigue-related information

Competency-Based training program

Provide training for managing and mitigating fatigue in your flight operations

1

Means to measure competency attainment

Evaluate the extent to which participants have applied the training and developed the required competencies

2

Communication procedure to inform employees of FRMS and fatigue-related information

Design a procedure to communicate information related to fatigue risk management and your FRMS

3

Component 4
FRMS Quality Assurance Program

Purpose:

Provide feedback on the level of compliance with and the effectiveness of your FRMS

FRMS Audit Process

Design a process to audit your FRMS to ensure that regulatory requirements are effectively implemented, compliance is monitored and non-compliance is corrected

1

FRMS Effectiveness Review Process

Design a process to monitor how effectively your FRMS is functioning and achieving its safety objectives

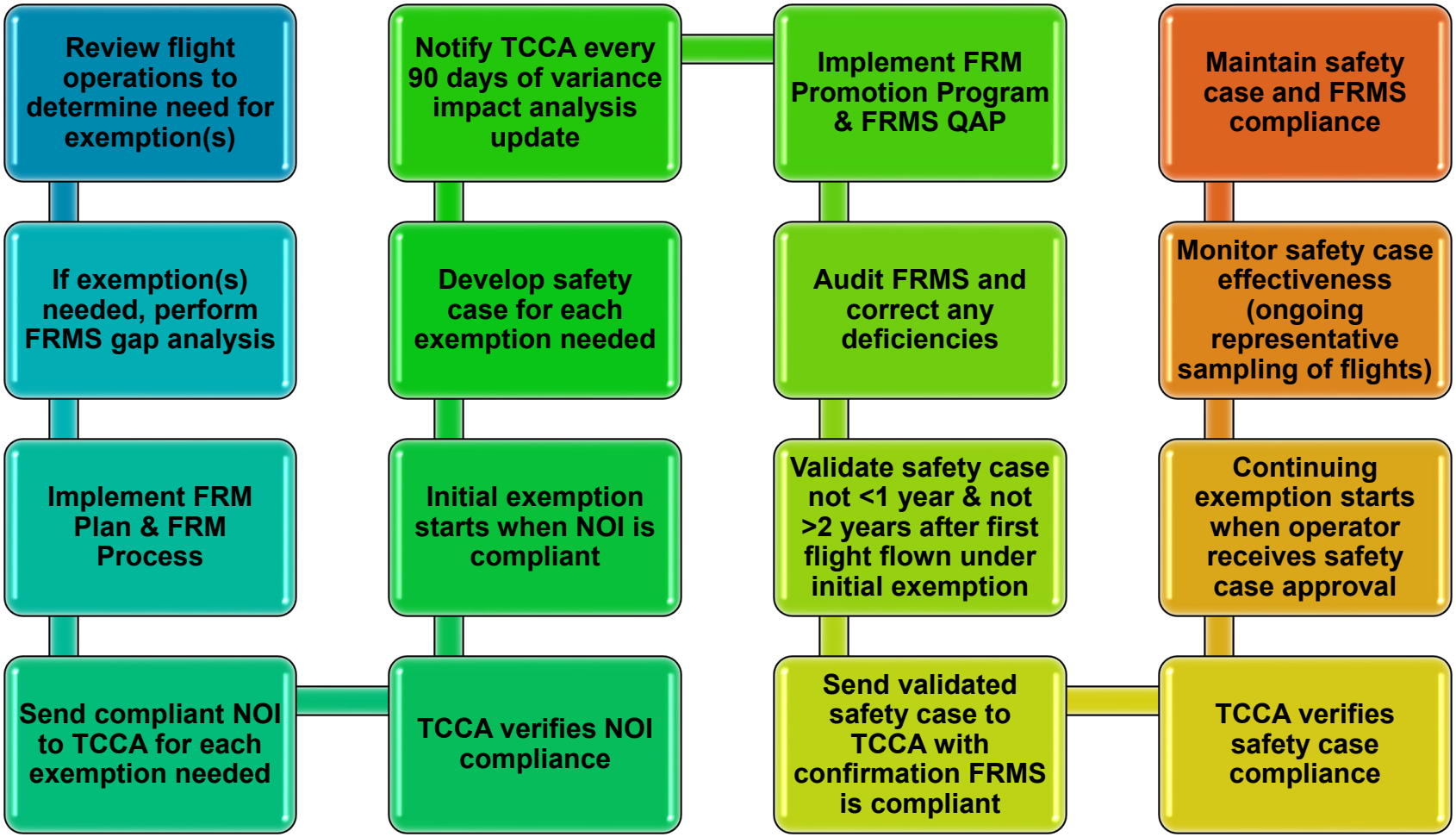
2

Variance monitoring procedures for effect on flight crew member fatigue and alertness

Design a procedure to monitor the safety case each 6-month period the exempted flight is conducted

3

Exemption & Safety Case Process



What's in a Notice of Intent?

1. Confirmation FRM Plan + FRM Process are implemented & maintained
   - Commitment to implement & maintain FRM Promotion Program + FRMS QAP
2. Description of flight subject to exemption
   - Flight/duty/rest provision to be exempted
   - How the flight will vary from that provision
3. Scientific studies showing the variance is not likely to have an adverse effect on fatigue & alertness levels of FCMs conducting the flight
4. Description of safety case that will be developed & validated for the flight
5. Commitment to conduct an initial FRMS audit
6. Name & contact information of person responsible for implementing FRMS

What's in a Safety Case?

1. Description of flight subject to exemption
   - Flight/duty/rest provision exempted
   - How the flight varies from that provision
2. Scientific studies used to demonstrate that the variance is not likely to have an adverse effect on fatigue & alertness levels of FCMs conducting the flight
3. Data collection methodology and data used to:
   - Establish baseline FCM fatigue & alertness levels
   - Identify fatigue hazards & risks of the flight
4. Fatigue risk controls implemented to address risk assessment findings
5. Procedures to measure variance effect on FCM fatigue & alertness levels
   - Data collection methods used for ongoing evaluation of the safety case
   - Analysis of variance effect, taking into account FCMs' schedule before & after the flight
   - Actions taken to remedy adverse effect of variance on FCM fatigue & alertness levels
6. Means to monitor effectiveness of the FRMS in managing the safety case

When is a Safety Case validated?

- Fatigue risk assessment conducted and findings analyzed:
  - Mitigations implemented and monitored to remedy increases in fatigue levels and decreases in alertness levels of FCMs conducting the flight
  - Corrective actions taken if mitigations do not remedy adverse effects of the variance
  - Mitigations and corrective actions verified effective in maintaining fatigue & alertness levels equivalent to baseline (i.e. compliant with flight, duty & rest rules)
- 1-2 years of fatigue & alertness data collected:
  - Starting when the flight is first conducted under initial exemption
  - Ending before initial exemption expires (3 years after operator sent NOI to TCCA)
  - Shows that not more than 5% of at least 20 consecutive flights have an adverse effect of more than 5% on the baseline fatigue & alertness levels of FCMs conducting the flight

Data Collection Period (1-2 years)

Flight Frequency	Example	# of Flights in 1-year Period	Data Collection 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 last 20 consecutive flights have an adverse effect of >5% on the baseline level of FCM fatigue & alertness
	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…	

Implementation Initiatives

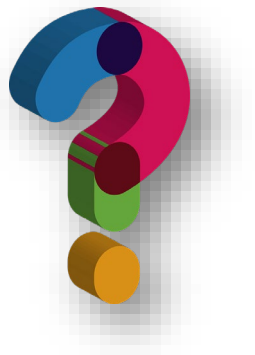
- FRMS pilot projects:
  - Now – 3 airlines (705)
  - Next – several commuter & air taxi operations (703, 704)
- Advisory Circulars:
  - AC 700-047: FCFM Prescriptive Limitations
  - AC 700-046: FRMS Requirements
  - AC 700-045: Exemption and Safety Case Process for FRMS
- FRMS Forum for Canadian air operators:
  - Nov. 21-22, 2019 in Montreal

Fatigue Risk Management Webpage

https://www.tc.gc.ca/en/services/aviation/commercial-air-services/fatigue-risk-management.html

- **Resource links:**
  - Examples of fatigue hazards, performance implications, mitigations
  - Example fatigue-related safety performance indicators
  - List of scientific studies related to fatigue and human performance
  - Coming soon: FRMS gap analysis form (fillable PDF)
- **Guidance examples** (by year-end)**:**
  - Safety cases
  - Fatigue data collection methodology
  - Fatigue risk assessment
  - Prioritized fatigue risk register
  - Manual fatigue modelling
  - Safety performance measurement
  - QAP checklist to assess FRMS effectiveness and compliance

Questions?



Flight crew fatigue management requirements –

Questions and interpretations:

- **Canadian air operators -**
  - Principal Operations Inspector
- **Others -**
  - TC.FCFM-GFEC.TC@tc.gc.ca