



Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada



Presentation to All Canada Aeromedical Transport Safety Conference Air Safety Issue Investigation A15H0001

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Transportation Safety Board of Canada
Virtual Delivery March 2, 2021

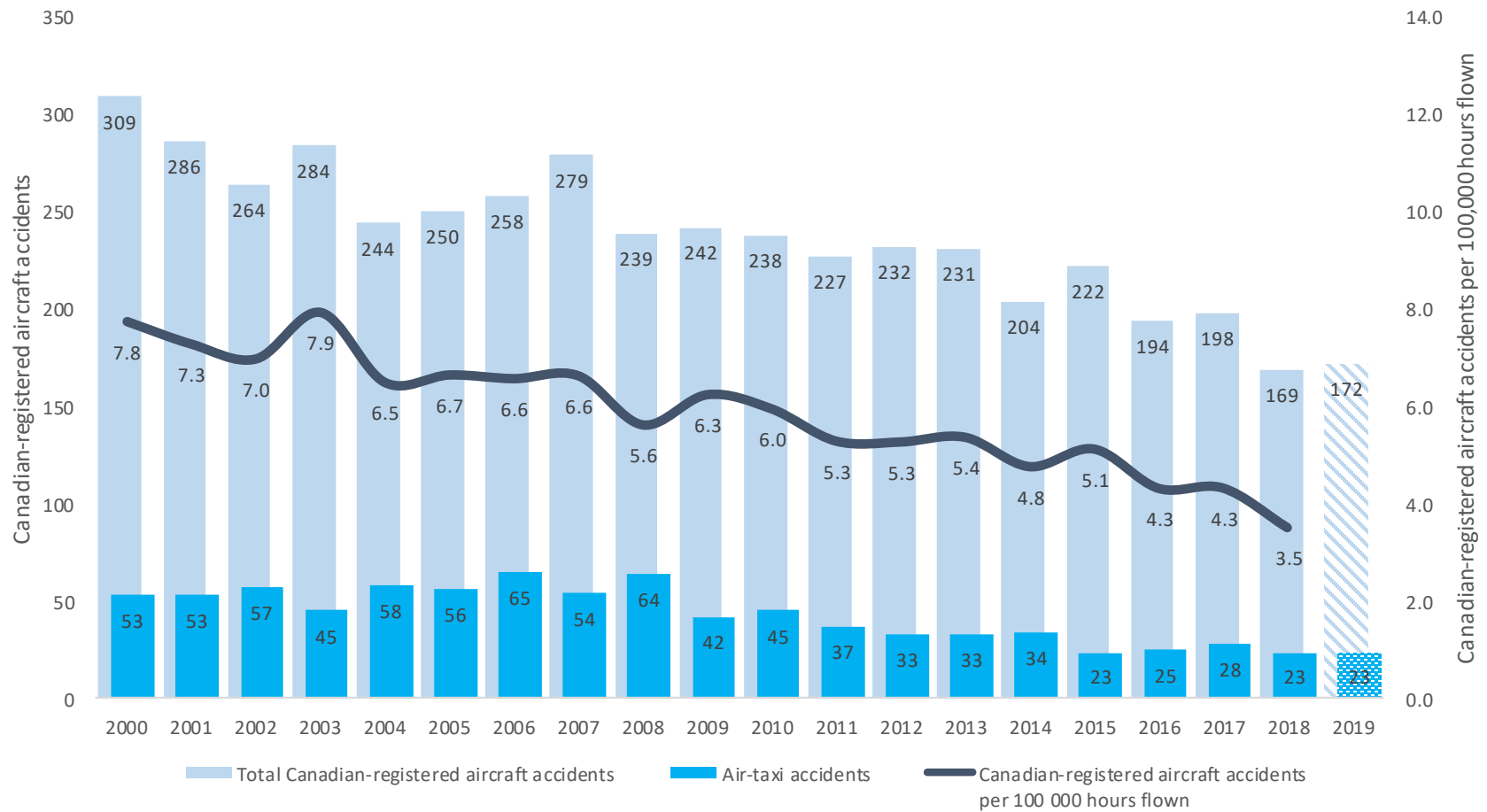
Canada 

Outline

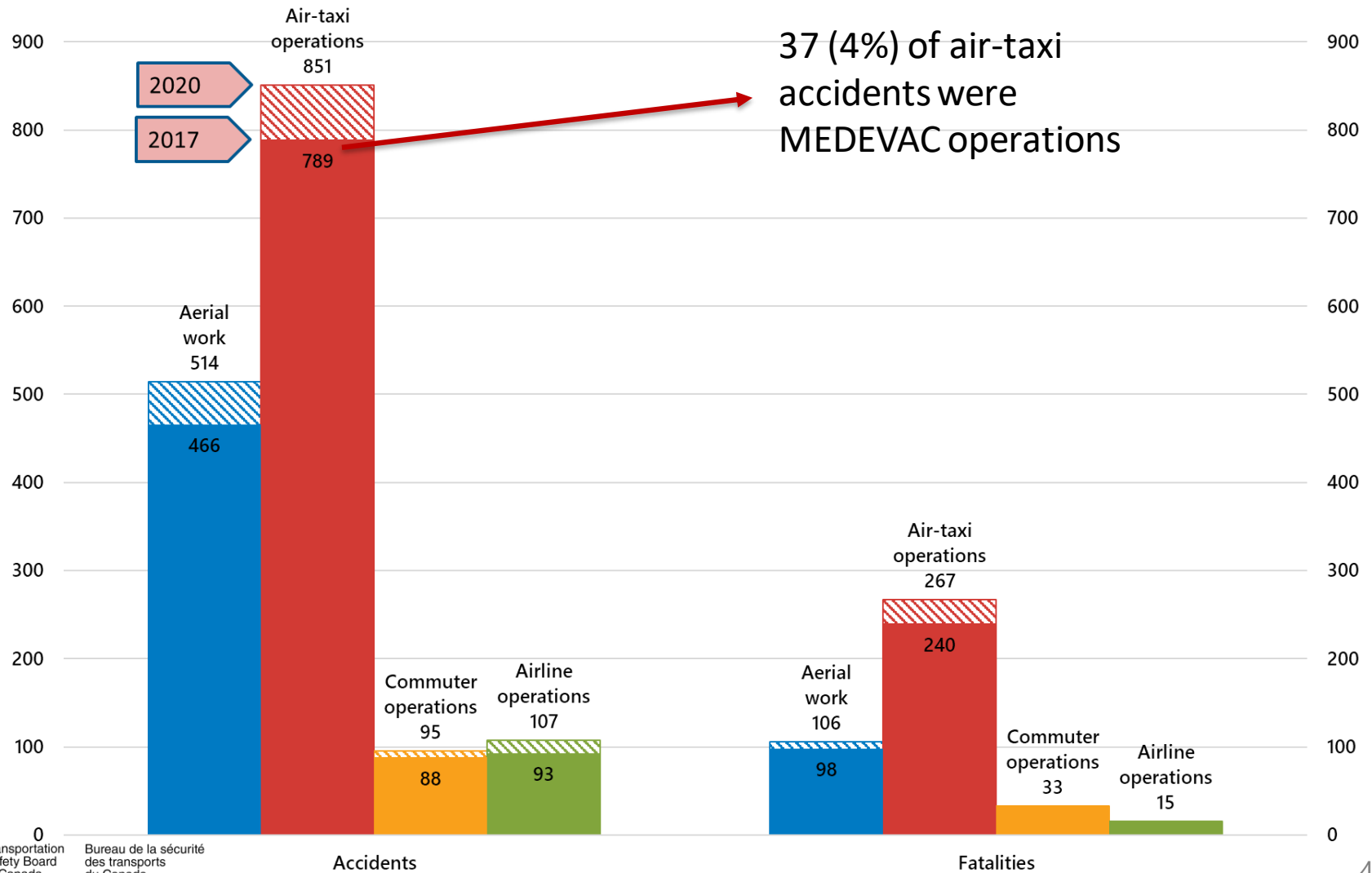
- Statistics and context: “It’s different”
- Research questions and previous studies
- 14 and 9 accident types
- 19 safety themes
- Safe operating envelope
- 2 key underlying factors
- Raising the bar on air-taxi safety
- Safety action required: TSB recommendations
- Going forward
- SECURITAS



A declining accident rate



Accidents and fatalities in Canadian-registered aircraft by operator type (2000-2020)



Context of air taxi operations in Canada



SII research questions

- What are the hazards and risk factors associated with air taxi operations in Canada?
- How are these being managed?
- What additional measures are needed to improve the safety of air taxi operations in Canada?



How the SII was conducted

- Study period 2000 to 2014
- Both quantitative and qualitative data and analysis
- The analysis of accident data included the study of:
 - 167 TSB investigation reports
 - 716 TSB reportable accidents
- Interviews with industry participants were conducted at all levels in various kinds of operations:
 - single-pilot and multi-crew
 - aeroplane, floatplane, helicopter
 - visual flight rules, instrument flight rules
 - MEDEVAC
 - TC inspectors



How the SII was conducted

- The results from the analysis of the accident data and the interview consultations were compared and synthesized with the findings from other reports and studies conducted on air-taxi accidents.
- We will highlight findings from:
 - The accident data
 - The industry consultations
 - The synthesis of the results into safety themes and a safe operating envelope model.

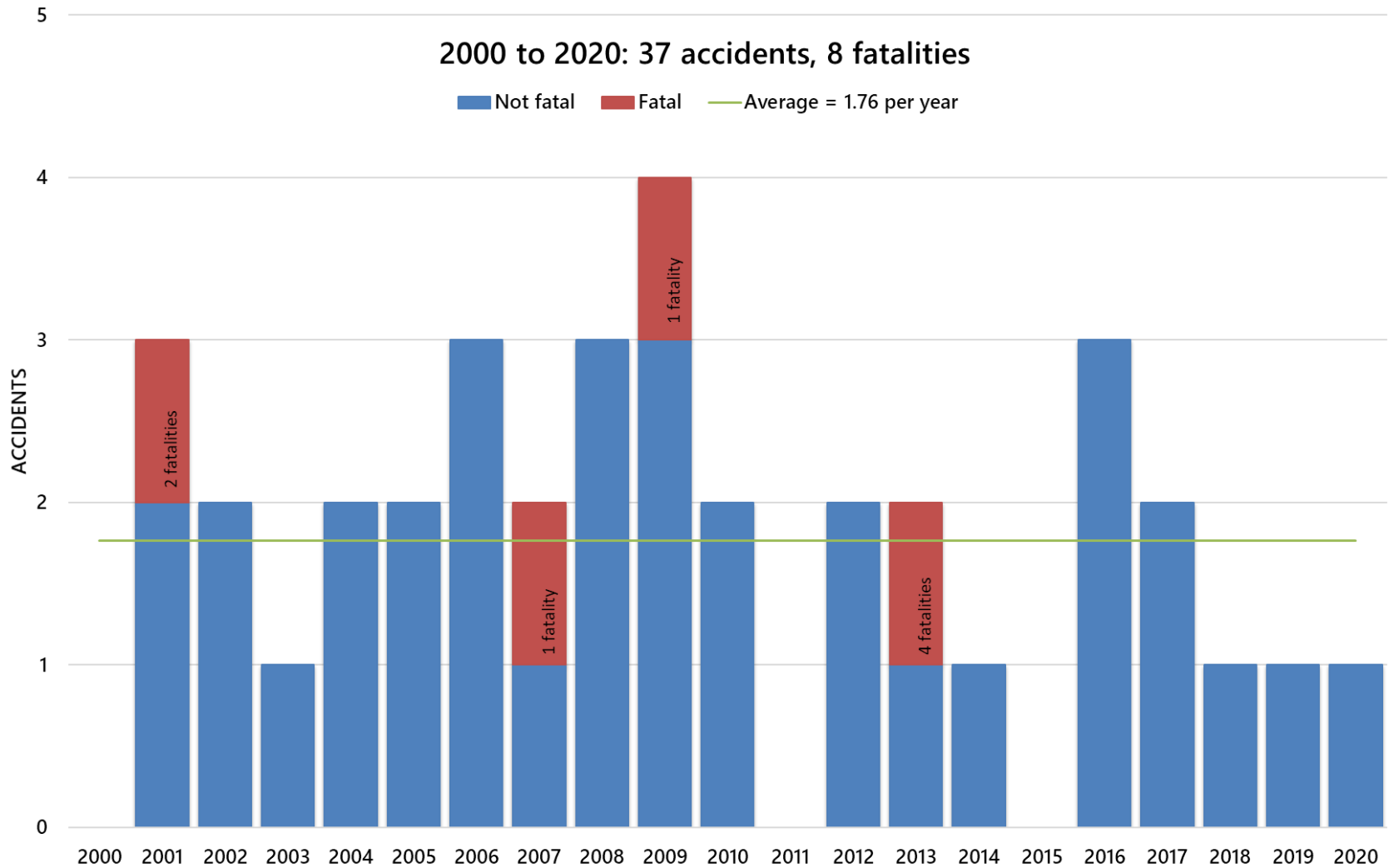


Results: Accident types

Aeroplane accident types (14) 110 accident reports	Helicopter accident types (9) 57 accident reports
<ul style="list-style-type: none">• VMC + Loss of Visual Reference + CFIT• VMC + Loss Visual Reference + LOC• Floatplane + LOC• Floatplane + Weight and Balance• ALA-Single pilot• ALA-Multi-crew• Icing• Risk of Collision/Mid-air collision• Maintenance-related• Manufacturing-related• Fuel-related• Takeoff condition• Exceptions*• Other*	<ul style="list-style-type: none">• VMC + Loss of Visual Reference + CFIT• VMC + Loss Visual Reference + LOC• Aerodynamic effects on control + LOC• Risk of collision/Midair collision• Maintenance-related• Manufacturing-related• Training-related• Exceptions*• Other*



Results: Accidents involving Canadian-registered aircraft in aeromedical operations



Results: Table of TSB MEDEVAC accidents with full reports (9) 2000-2020

Year	TSB Occurrence Number	TSB Report and local time	Aircraft Type	SII Accident Type
2001	A01C0236	CFIT, 23:33	Fairchild SA226TC	ALA Multi-crew
2002	A02P0290	Gear-up landing, 20:52	Cessna Citation 550	ALA Multi-crew
2006	A06Q0190	Runway overrun, 05:07	Learjet 35A	ALA Multi-crew
2007	A07C0001	Collision with terrain, 20:02	Beech A100 King Air	ALA Multi-crew
2008	A08O0029	CFIT, 22:02	Sikorsky S-76A	VMC-LVR-CFIT
2009	A09A0036	LOC/Collision with terrain, ~07:00	Britten-Norman Islander	VMC-LVR-LOC
2012	A12O0005	Runway overrun, 22:21	Pilatus PC-12/45	ALA Multi-crew
2013	A13H0001	CFIT, 00:12	Sikorsky S-76A	VMC-LVR-CFIT
2019	A19C0038	Fuel exhaustion, 18:23	Beechcraft B200	Fuel



Results: 19 safety themes from synthesis

- Aerodromes and infrastructure
- Availability of qualified personnel
- Collision avoidance
- Interruptions and distractions
- MEDEVAC operations
- Night operations
- On-board technology
- Survivability
- Weather information
- Acceptance of unsafe practices
- Fatigue

- Maintaining air-taxi aircraft
- Operational pressure
- Pilot decision-making (PDM) and crew resource management (CRM)
- Training of pilots and other flight operations personnel
- Training of aircraft maintenance engineers (AMEs)
- Safety management
- Regulatory framework
- Regulatory oversight



Results: Highlights from selected safety themes

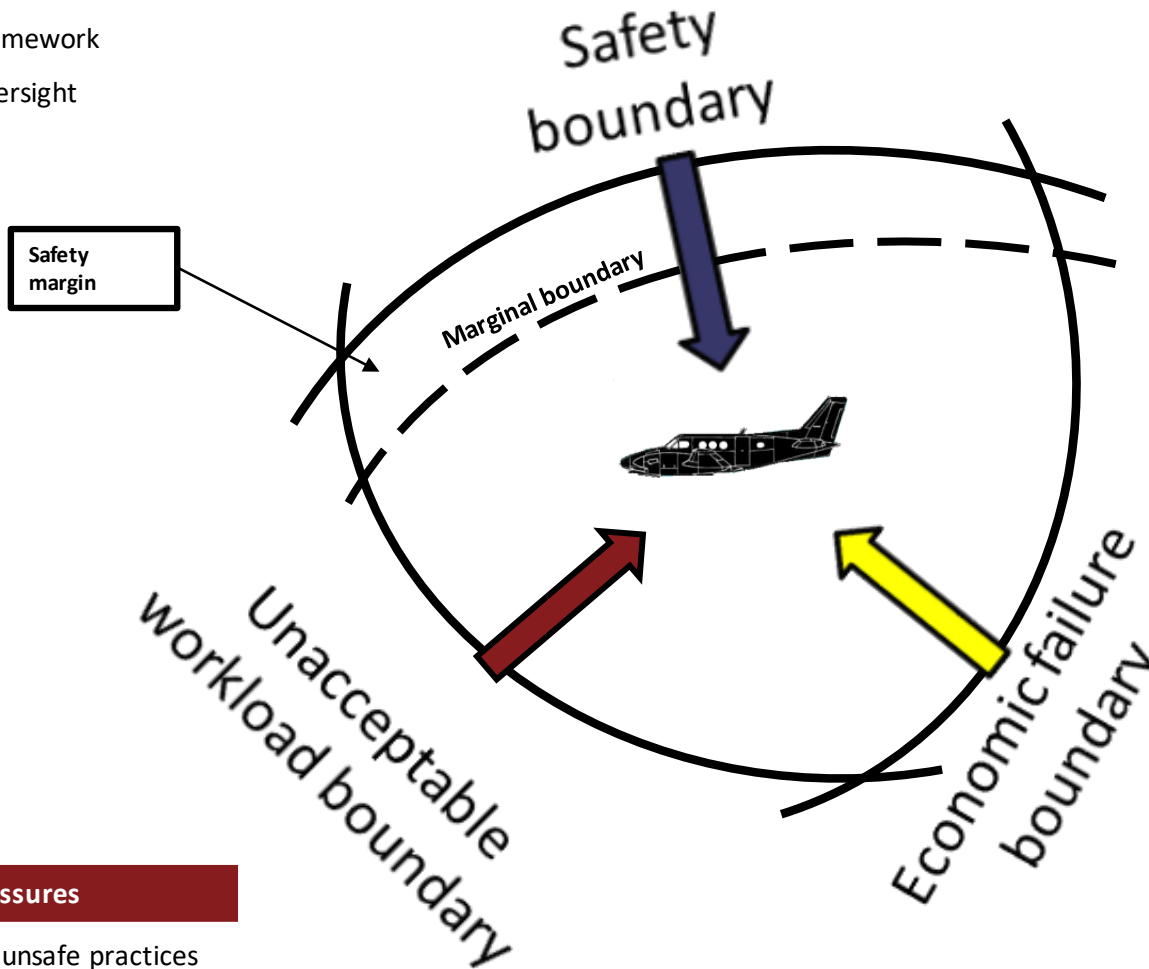
- Medevac
- Night operations
- Weather
- Acceptance of unsafe practices
- Fatigue
- Operational pressure
- Pilot decision making and crew resource management



Safety pressures

- Pilot decision making and crew resource management
- Training of pilots and other flight operations personnel
- Training of aircraft maintenance engineers
- Safety management
- Regulatory framework
- Regulatory oversight

Safe operating envelope model



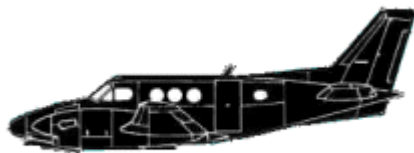
Operating pressures

- Acceptance of unsafe practices
- Fatigue
- Maintaining air-taxi aircraft
- Operational pressure

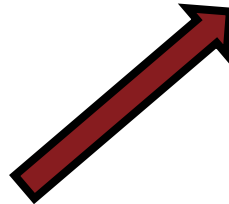
Sector pressures

- Aerodromes and infrastructure
- Availability of qualified personnel
- Airborne collision avoidance
- Interruptions and distractions
- MEDEVAC operations
- Night operations
- On-board technology
- Survivability
- Weather information

An example...



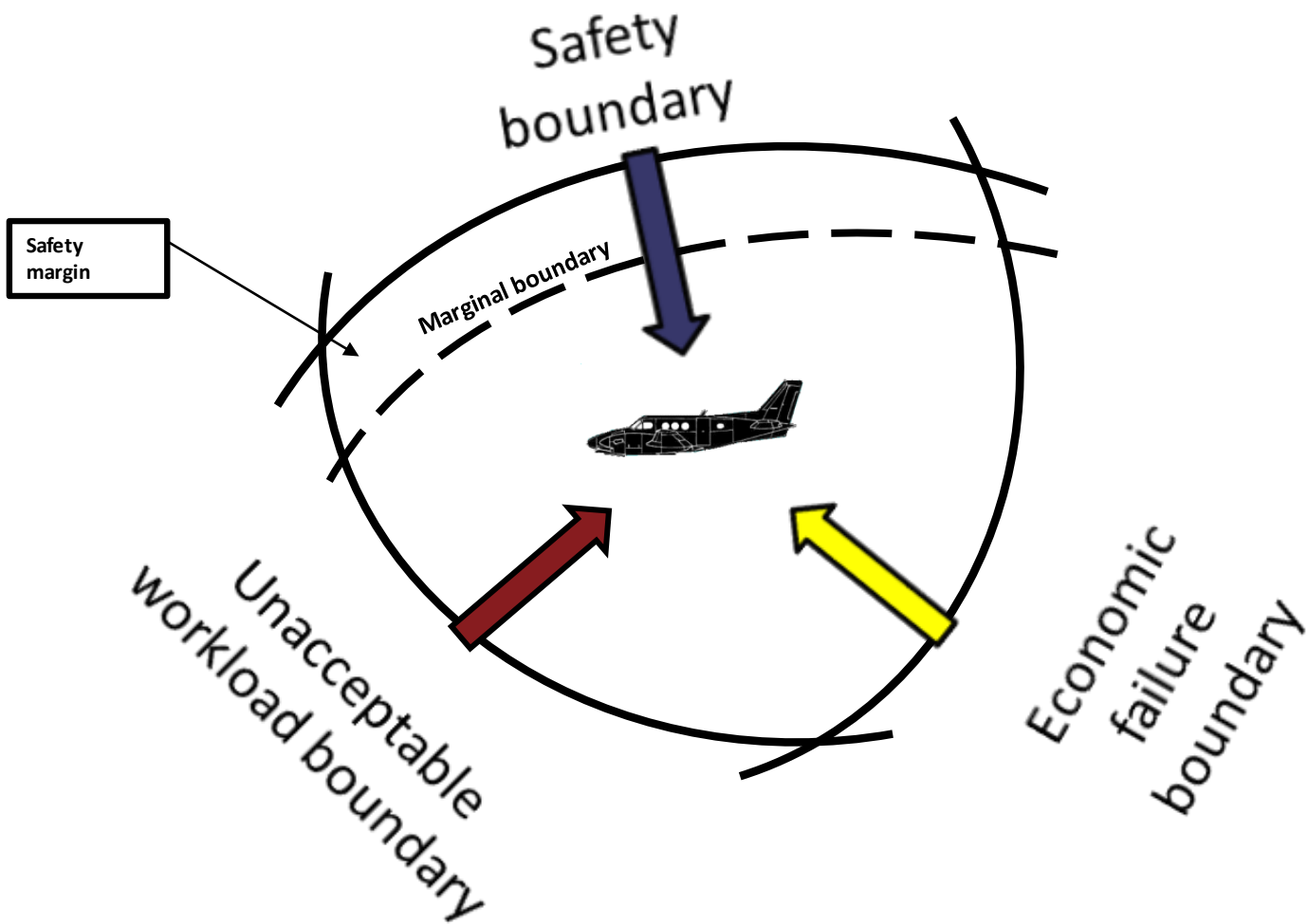
Safety
pressure

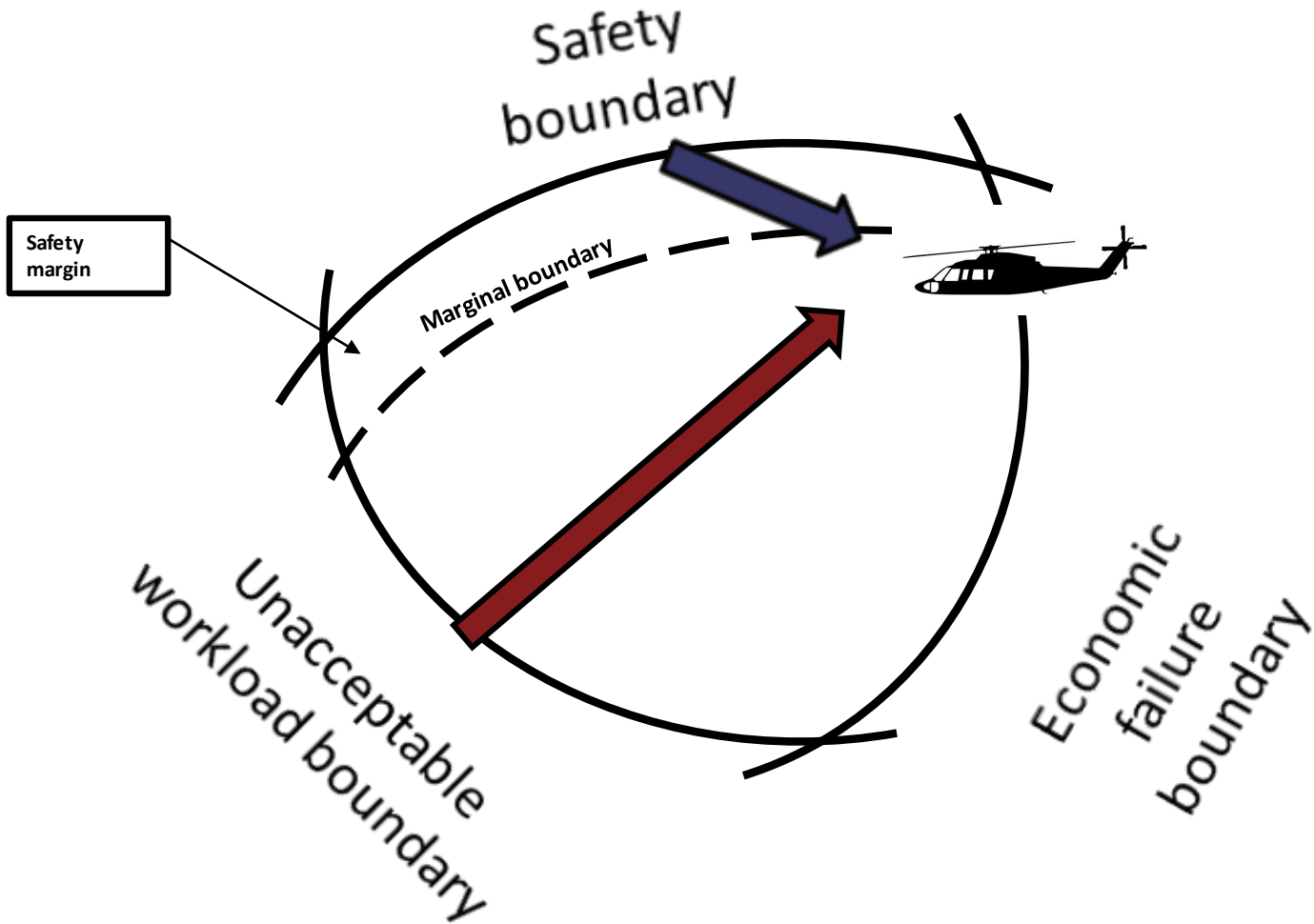


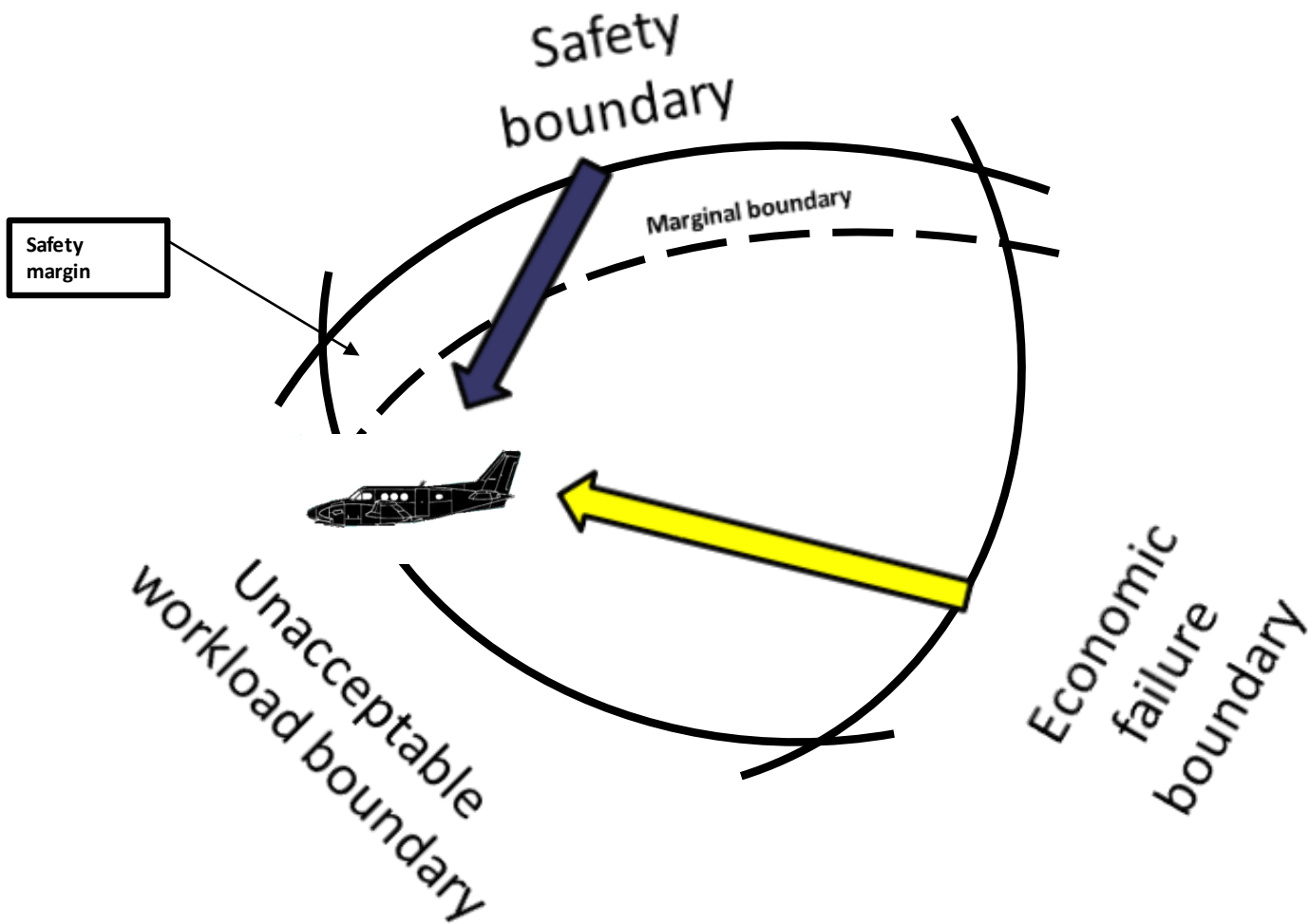
Operational
pressure

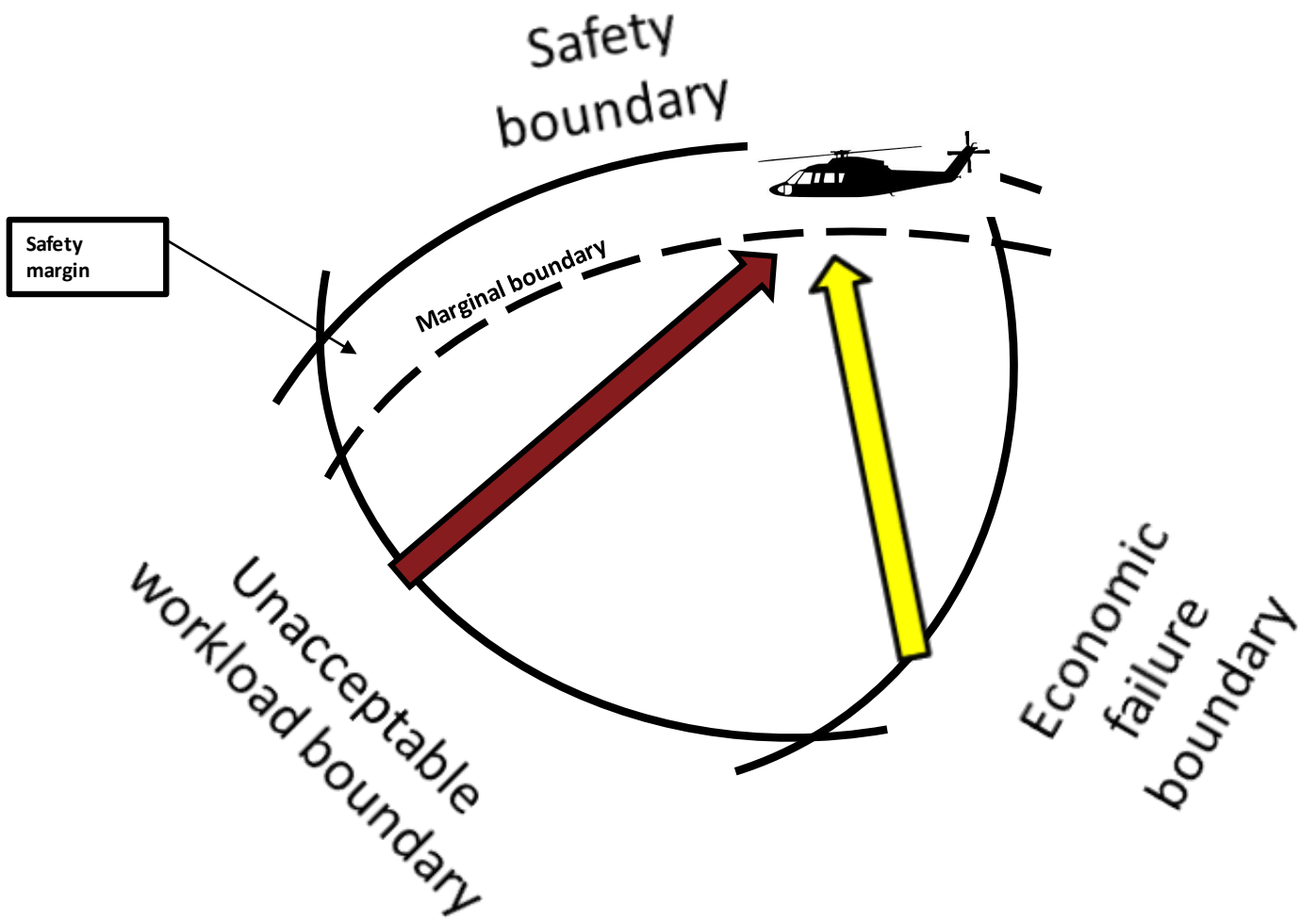
Sector
pressure

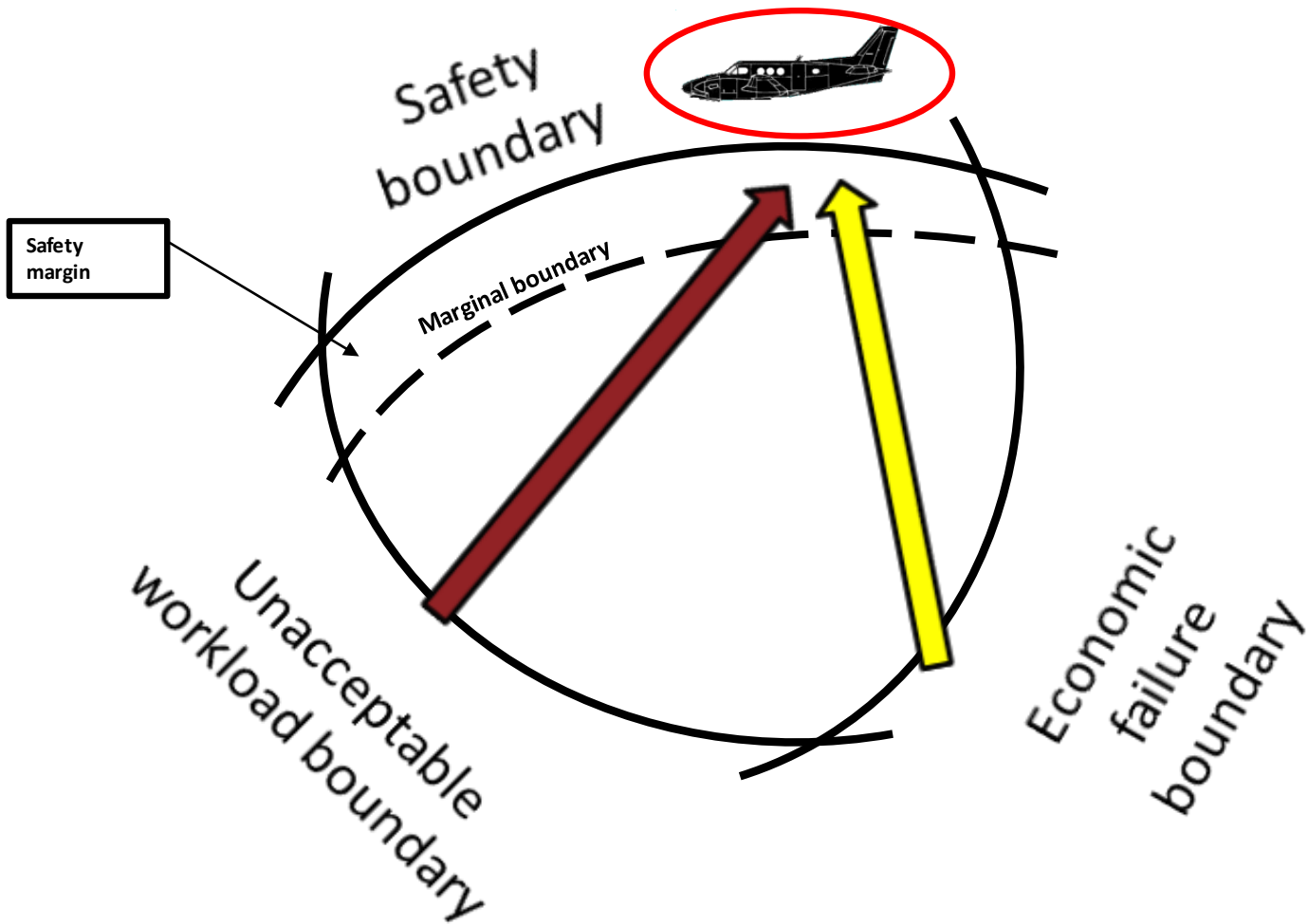


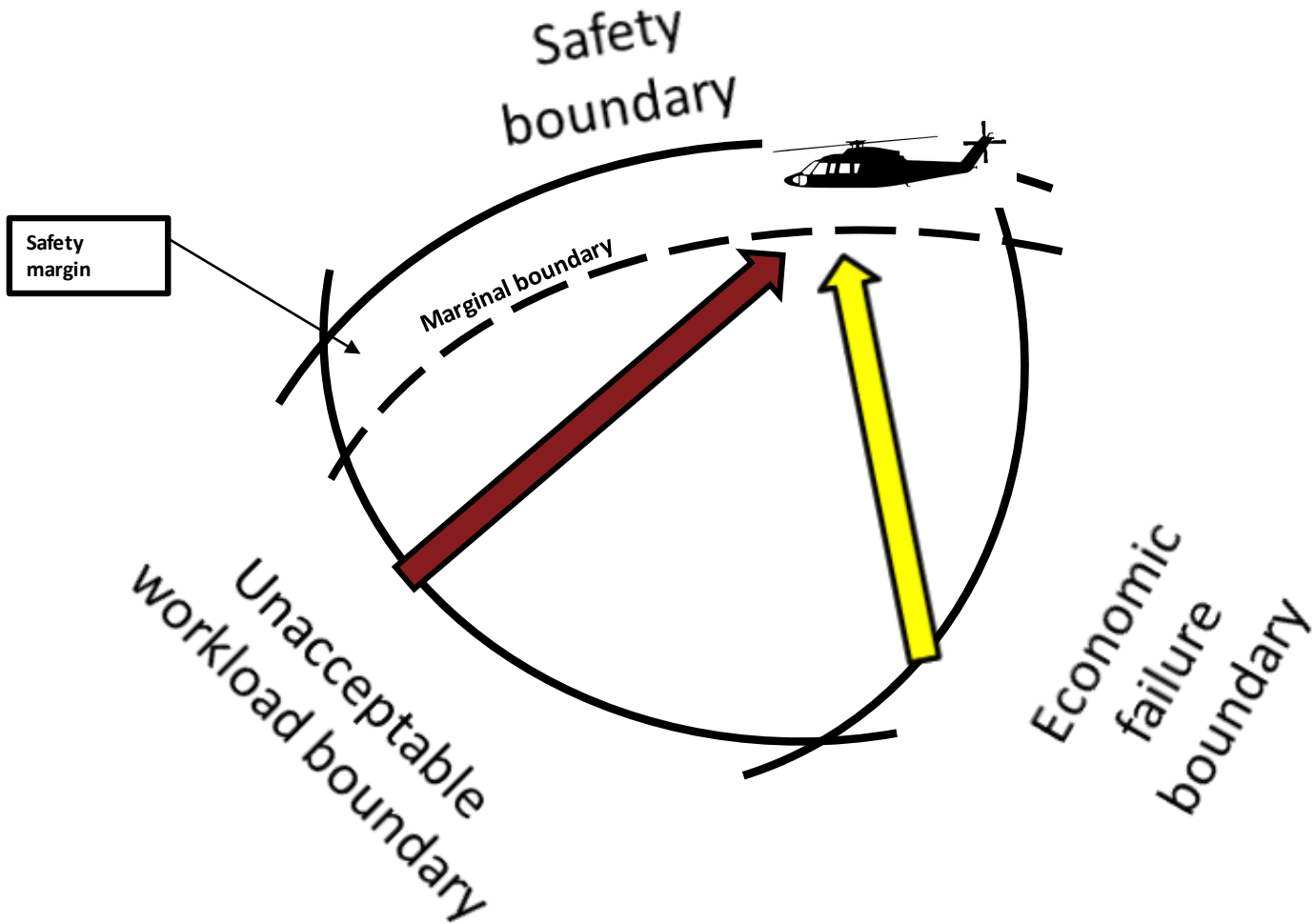


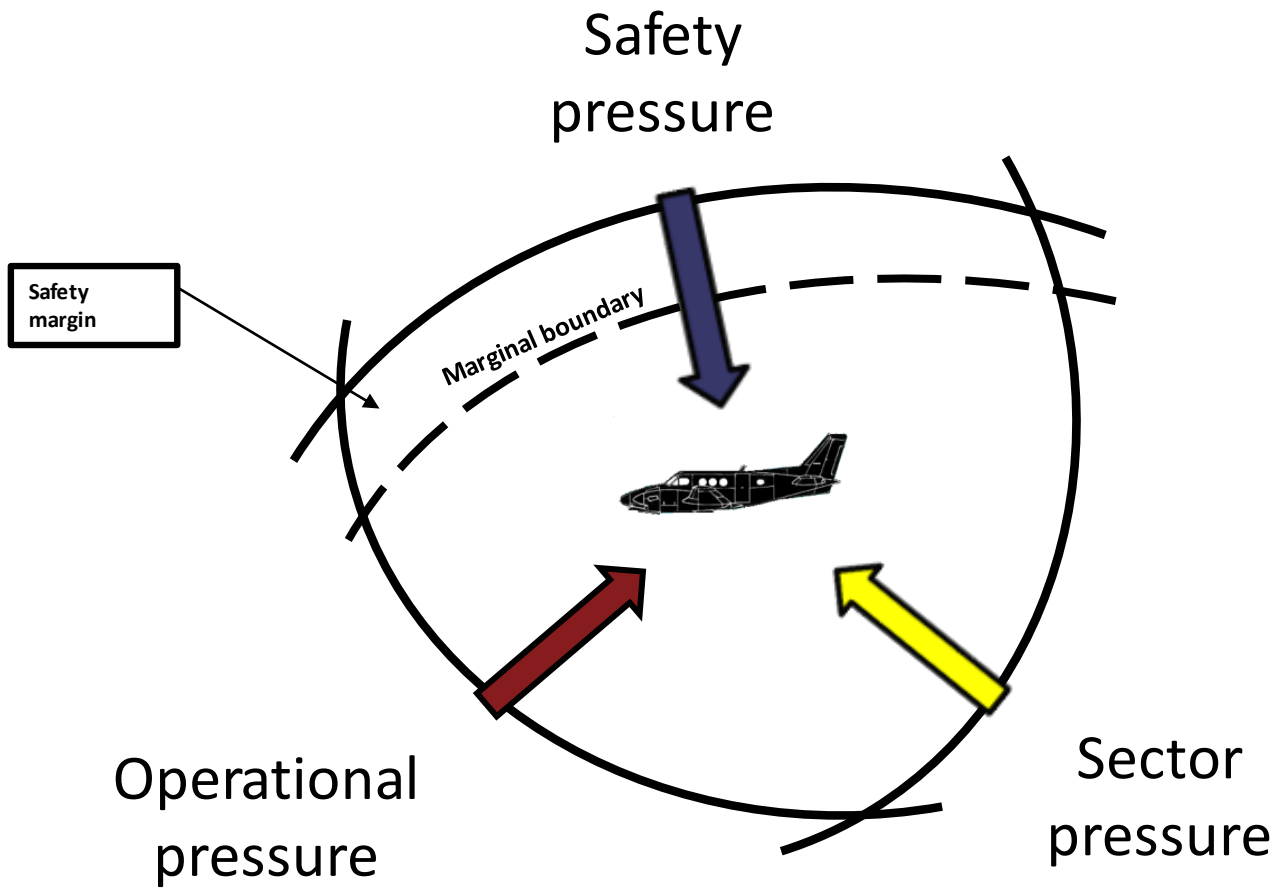








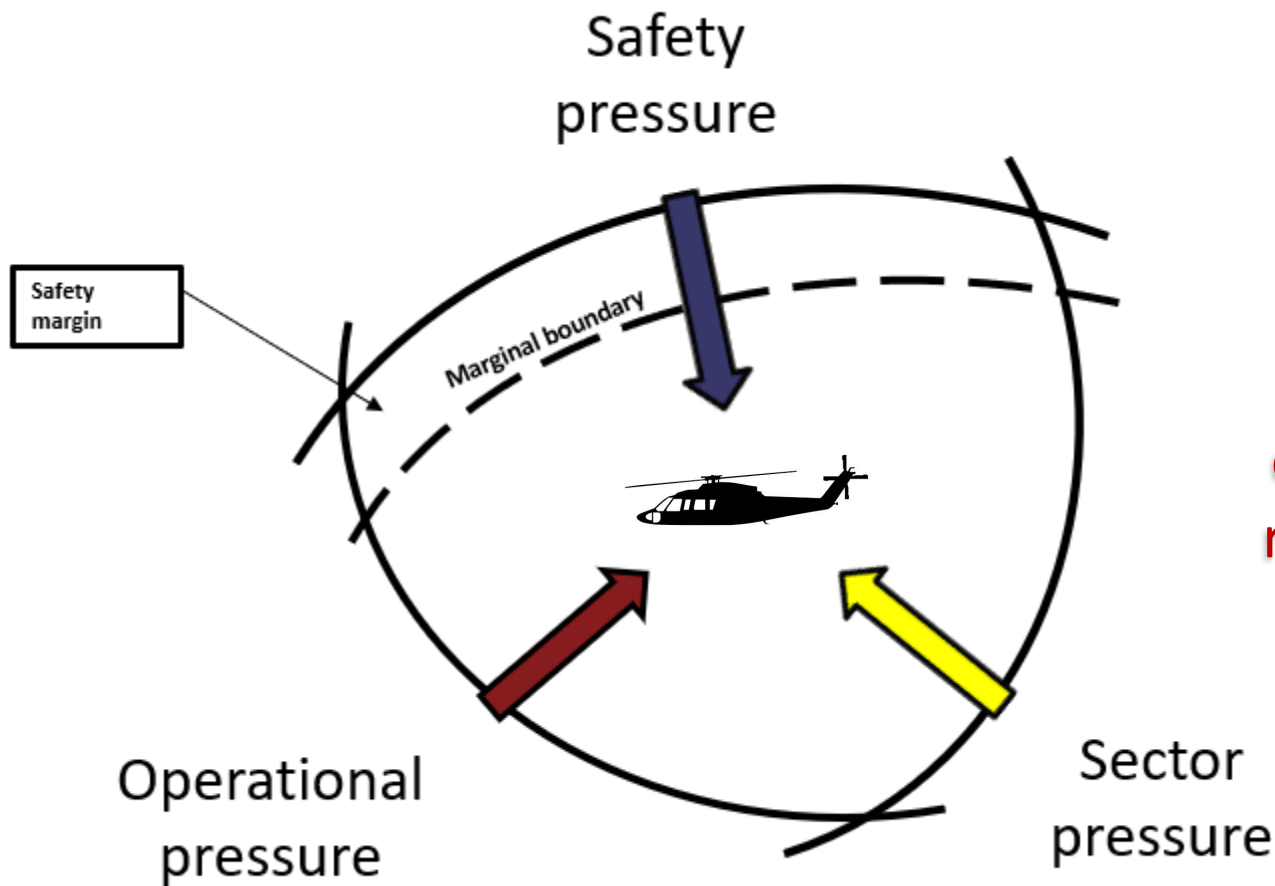




Conclusions: 2 key underlying factors

- **Acceptance of unsafe practices**
- **Inadequate management of operational hazards**

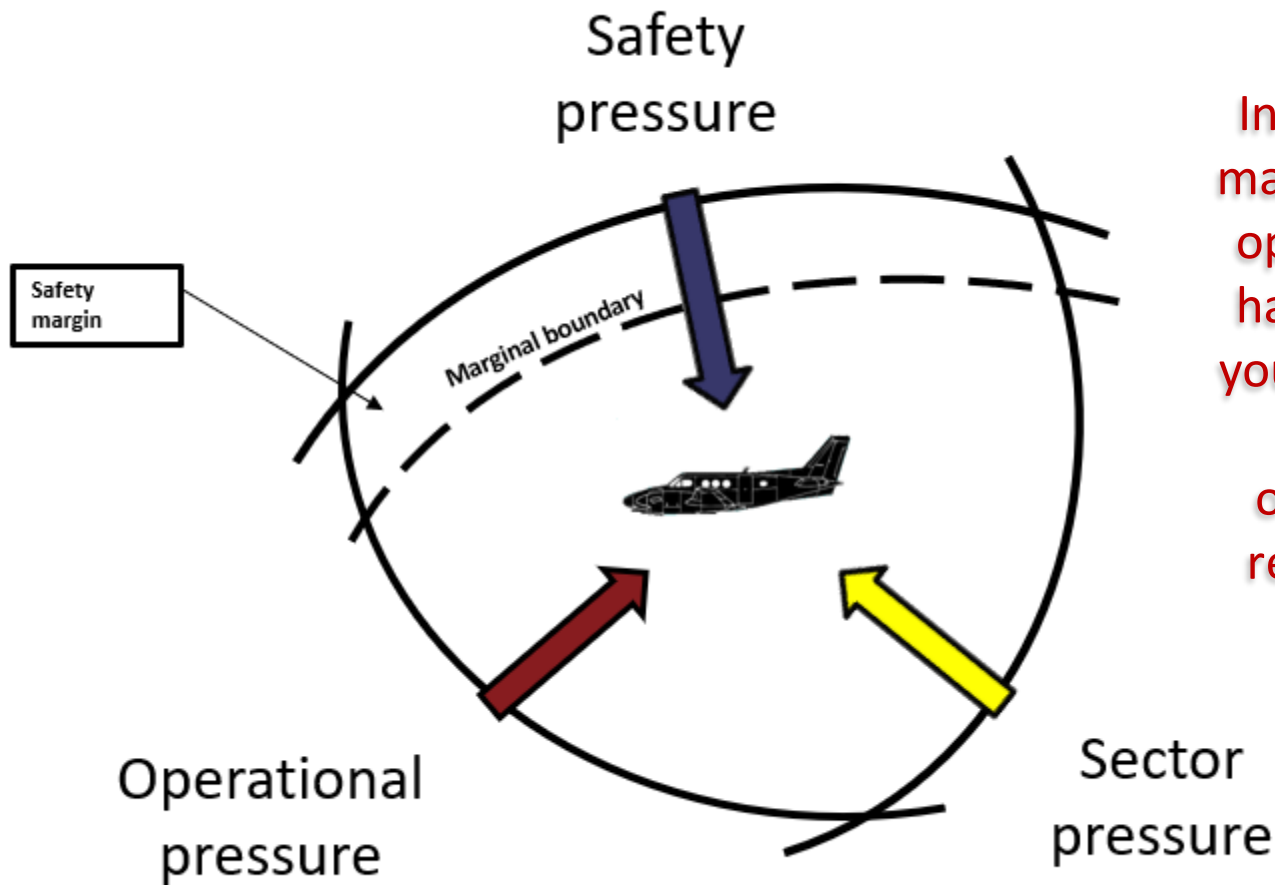




What unsafe practices are you seeing in your operation related to:

- Crew communication and coordination breakdowns
- Altering duty day start times or hours so that mission can launch and be completed within prescriptive regulation; splitting duty days
- Going too fast – flight planning, running SOPs, airspeed
- Poor management of speed, altitude, climb
- Flying with known defects
- Distracted
- Errors made using GPS
- Spatial disorientation and illusions

- Marginal VMC to IMC encountered enroute
- Flying on instruments, instrument-rated, but lacking experience
- Unsupervised operations
- Audits and inspections incomplete
- Flying without deicing
- Departing into known weather conditions below limits
- Flying unapproved SEIFR, GPS navigation and approaches
- Training delivered meets regulations, but not operations
- Landing at aerodromes with minimal services, unprepared



What Inadequate management operational hazards are you seeing in your operation related to:

- Fatigue from poor schedules, poor on-call policies, excluding transit time to/from remote bases from schedule, adequate resources (flight and aeromedical crew), inadequate rest
- Maintaining service levels for aircraft availability/serviceability and flight crew availability given contract bidding process
- Inherent moral pressure in MEDEVAC operations

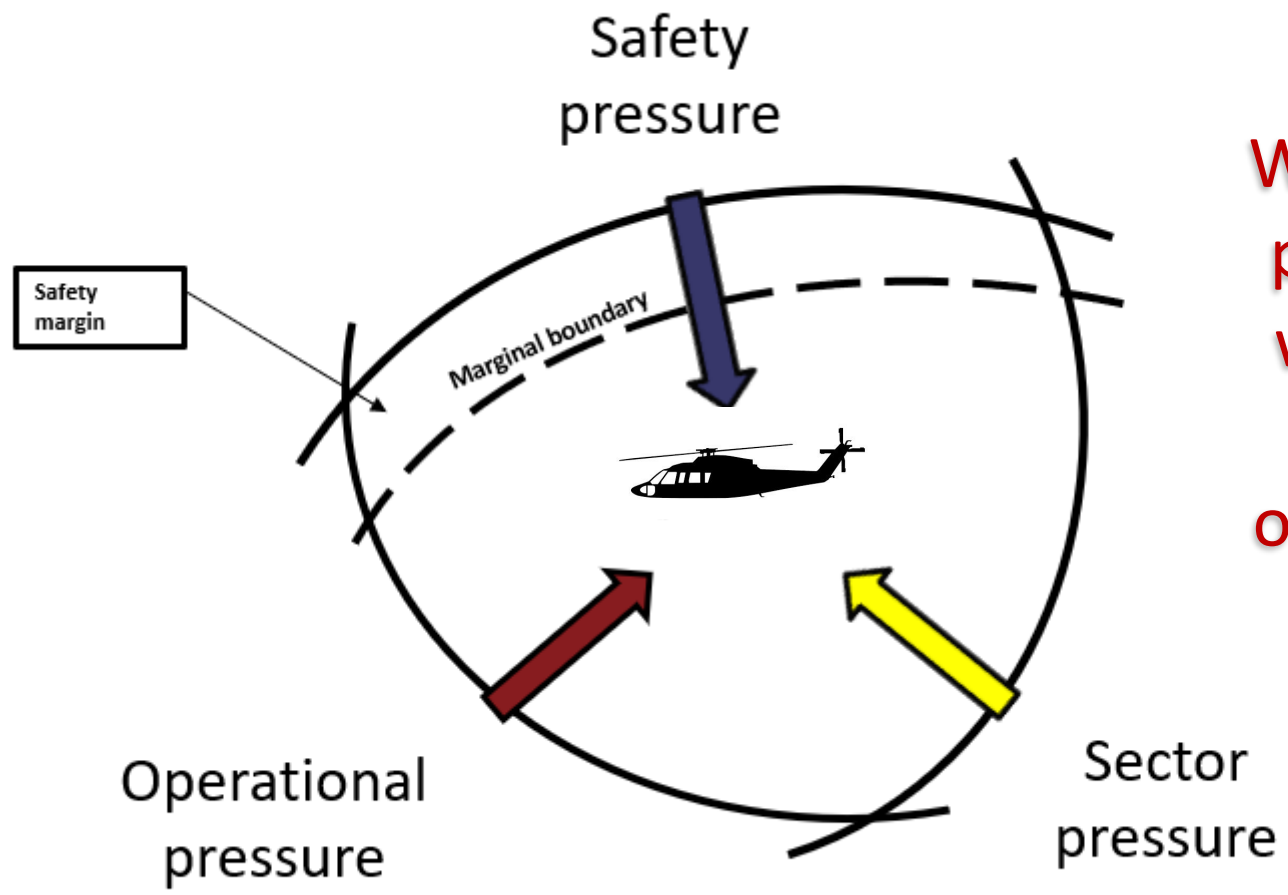
- Challenging airports, short runways, minimal services and navigation including deicing capabilities at some locations
- Inexperienced pilots
- Flight training to regulatory standard not commensurate with MEDEVAC operations and environment
- Competing limitations between aircraft limitations and patient/medical limitations (e.g. turbulence)
- VFR into IMC at slow speed
- RW operations without instrument rating or IFR training
- No helmet
- Inadequate lighting to maintain visual reference at night

Conclusion: How do we raise the bar on safety?

- **Increase safety pressure to push against operational pressure and sector pressures thereby:**
 - **Accepting *only* safe practices**
 - **Adequately *managing* operational hazards**



- Well maintained aircraft and equipment
- Dispatch criteria sensitive to safety and patient and risk management for go/no go
- Strong, MEDEVAC sensitive, SOPs
- Training and recurrent training for MEDEVAC ops
- Training flight and aeromedical crews together (e.g. CRM)
- Culture that supports decision making of flight crews
- Competitive compensation
- Contracts that match operational needs and environments (e.g. equipment, experience, scheduling, accommodation standards, weather minima)



What safety pressure is working in your operations?

Safety action required: What recommendations did TSB make?

- 22 active TSB recommendations that apply to the air-taxi sector and need to be addressed
- 4 new TSB recommendations
 - A19-02
 - A19-03
 - A19-04
 - A19-05



Safety action required: TSB Recommendation A19-02

"... the Department of Transport collaborate with industry associations to develop strategies, education products, and tools to help air-taxi operators and their clients eliminate the acceptance of unsafe practices."

– A19-02



Safety action required: TSB Recommendation A19-03

"... industry associations (e.g., ATAC, HAC, AQTA, FOA, NATA) promote proactive safety management processes and safety culture with air-taxi operators to address the safety deficiencies identified in this safety issue investigation through training and sharing of best practices, tools, and safety data specific to air-taxi operations."

– A19-03



Safety action required: TSB Recommendation A19-04

"... the Department of Transport review the gaps identified in this safety issue investigation regarding Subpart 703 of the Canadian Aviation Regulations and associated standards, and update the relevant regulations and standards."

– A19-04



Safety action required: TSB Recommendation A19-05

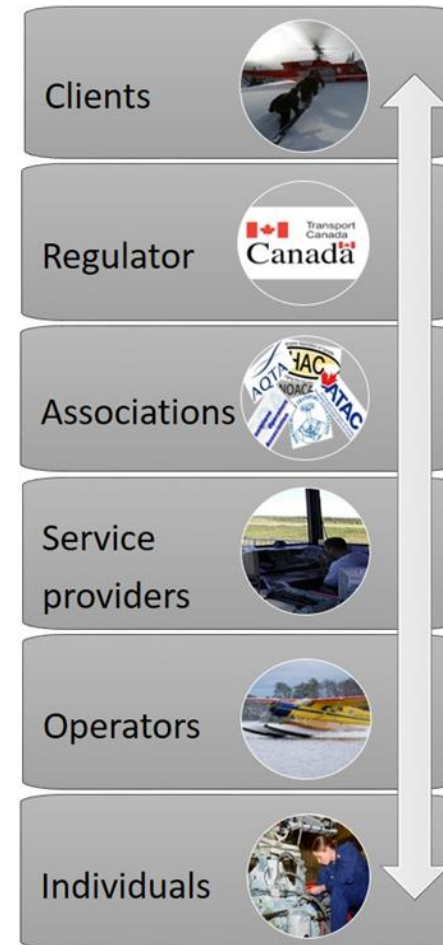
“ ... the Department of Transport require all commercial operators to collect and report hours flown and movement data for their aircraft by Canadian Aviation Regulations subpart and aircraft type, and that the Department of Transport publish those data.”

– A19-05



Going forward...

It will take effort from ***all stakeholders*** in the air-taxi industry to increase safety and reduce risk



Ask each other – you might be surprised by what you learn!!

Going forward...

Who are your clients? What can they do to raise the bar from their influence?

Clients



Does your SMS office or safety officer know about the regulator's plans for a safety campaign?

Regulator



With which associations are you affiliated? Does the medevac sector have its own?

Associations



How do you interact with Nav Canada, airports, aerodromes, hospitals, etc.?

Service providers



What are your companies doing about operational hazards? Are your safety reports effective?

Operators



What are you doing to work safely and eradicate unsafe practices? Think positive peer pressure!

Individuals





SECURITAS

- *SECURITAS* enables a person to report, in complete confidence, concerns one may have about safety or situations that pose risks to the transportation system in Canada, and that would otherwise go unreported.
- The objective of *SECURITAS* is to provide a voluntary confidential reporting system so that individuals can report safety related concerns to the TSB without fear of reprisal.
- The Transportation Safety Board of Canada will never reveal your identity or any information that could identify who you are.
- Pilots, medics, AMEs, ATC/flight services specialists, dispatchers, flight attendants, patients, passengers – your securitas reports matter to us!! You can report fatigue issues, weather issues, unsafe acts and conditions – **share** your concerns with us.

E-mail: securitas@bst-tsb.gc.ca (preferred)

Call toll-free: 1-800-567-6865

Mail: PO Box 1996 Station B

Gatineau QC J8X 3Z2



In summary...

- Operational context matters: it's an inherent part of the accident risk in air-taxi operations
- No single issue is the problem, many issues interact
- 2 key underlying factors:
 - Acceptance of unsafe practices
 - Inadequate management of operational hazards
- Manage 3 key pressures:
 - Safety pressures
 - Operational pressures
 - Sector pressures
- 4 new recommendations
- Engage all stakeholders together to raise the safety bar



QUESTIONS?



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Accessing A15H0001

- Air transportation safety issue investigation A15H0001
Raising the bar on safety: Reducing the risks associated with air-taxi operations in Canada
 - <https://www.tsb.gc.ca/eng/enquetes-investigations/aviation/2015/a15h0001/a15h0001.html>
- Transportation Safety Board of Canada
 - <https://www.tsb.gc.ca>
- Securitas
 - <https://www.tsb.gc.ca/eng/securitas/index.html>



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