

Parallel Session

*Current State of Mitigation:
Flight Operations*

The easyJet Fatigue Risk Management System (FRMS)

Captain Simon Stewart
easyJet Airline, Ltd.

&

Alexandra Holmes
Clockwork Research

8:35 - 9:00

June 18, 2008



Captain Simon Stewart
Biography

Simon Stewart is currently the Head of Strategic Safety Development at easyJet. Prior to that role he was the easyJet Flight Operations Safety and Quality Manager for 3 years. He is responsible for the development and implementation of easyJet SMS systems, of which, the Fatigue Risk Management System (FRMS) is an integral component. He is currently documenting the FRMS as part of his postgraduate studies at London City University with Dr Alex Holmes & Dr Steve Bond.

Alexandra Holmes, Ph.D.
Biography

Alexandra Holmes is Research Director at Clockwork Research, a London-based company providing fatigue risk management services to airlines, the road transport industry and emergency services. She has worked closely with easyJet for the past 5 years and assisted the company in becoming the first European airline to implement a fatigue risk management system (FRMS). Alex is a sleep, fatigue and shiftwork specialist and completed a PhD with the Centre for Sleep Research in Australia.

Alex primarily works with commercial airlines, both short-haul and long-haul, to enhance the extent to which their safety management systems consider fatigue risk. Alex has developed a range of operational processes for managing fatigue including fatigue reporting systems, incident investigation tools and roster quality indices. She is an experienced workshop host and develops training for management, scheduling staff and crew. Alex regularly runs Line Operations Safety Audit (LOSA) programmes and conducts research to explore the causes and consequences of fatigue and the level of fatigue risk to which an operation is exposed.

The easyJet Fatigue Risk Management System

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The problem with assuming that compliant is equivalent to safe...



1995

1 base

3 airports

2 routes

2 leased aircraft

Virtual airline!

2008

20 bases

103 airports

26 countries

400 routes

170 aircraft

39 million pax

7000 employees



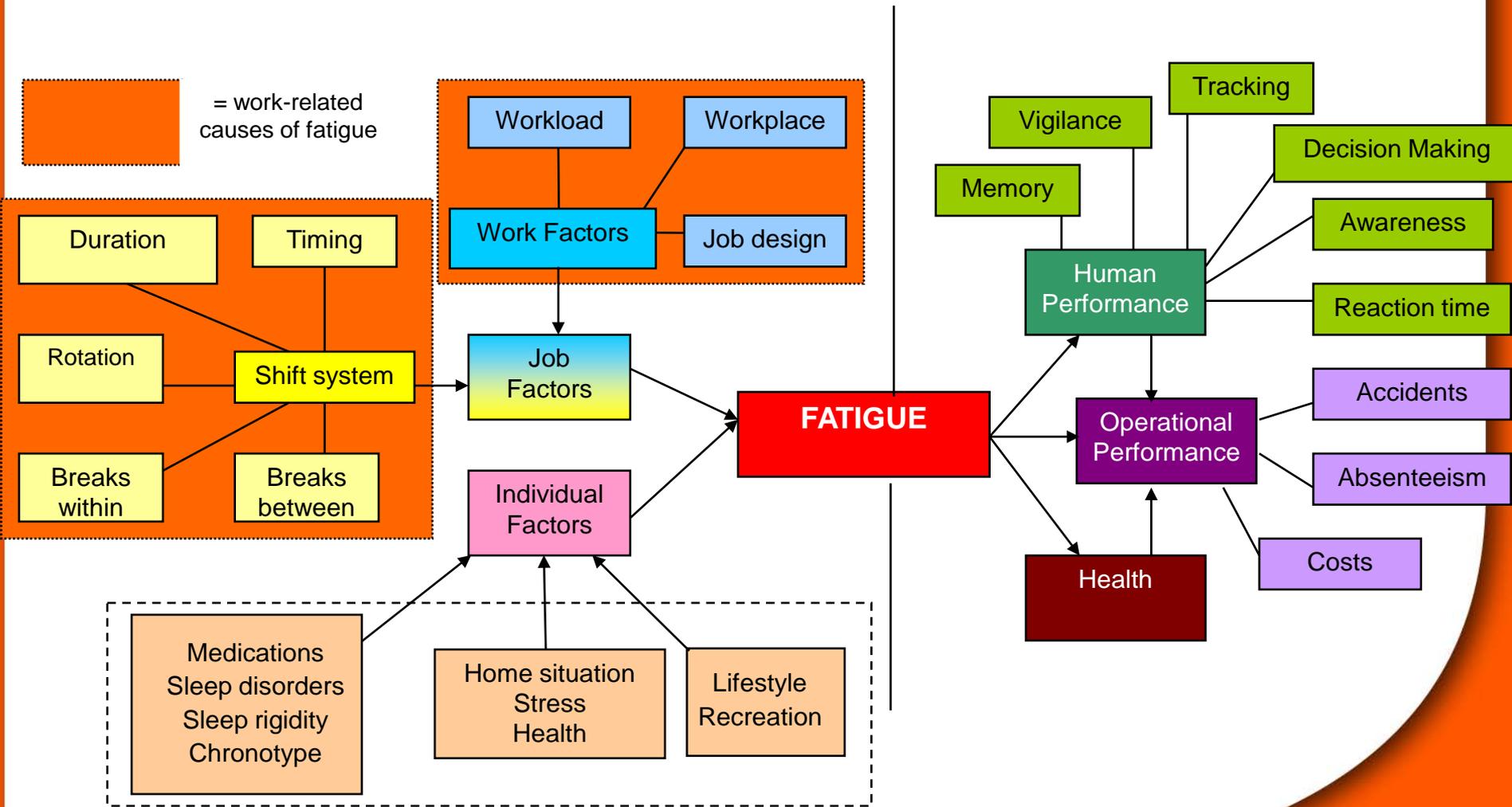
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Operational risk

“...in line with increased crew utilisation, the overall operating environment has become significantly more complex, leading to an increase in levels of operational risk.”

UK Civil Aviation Authority 2007

Fatigue hazards and risks



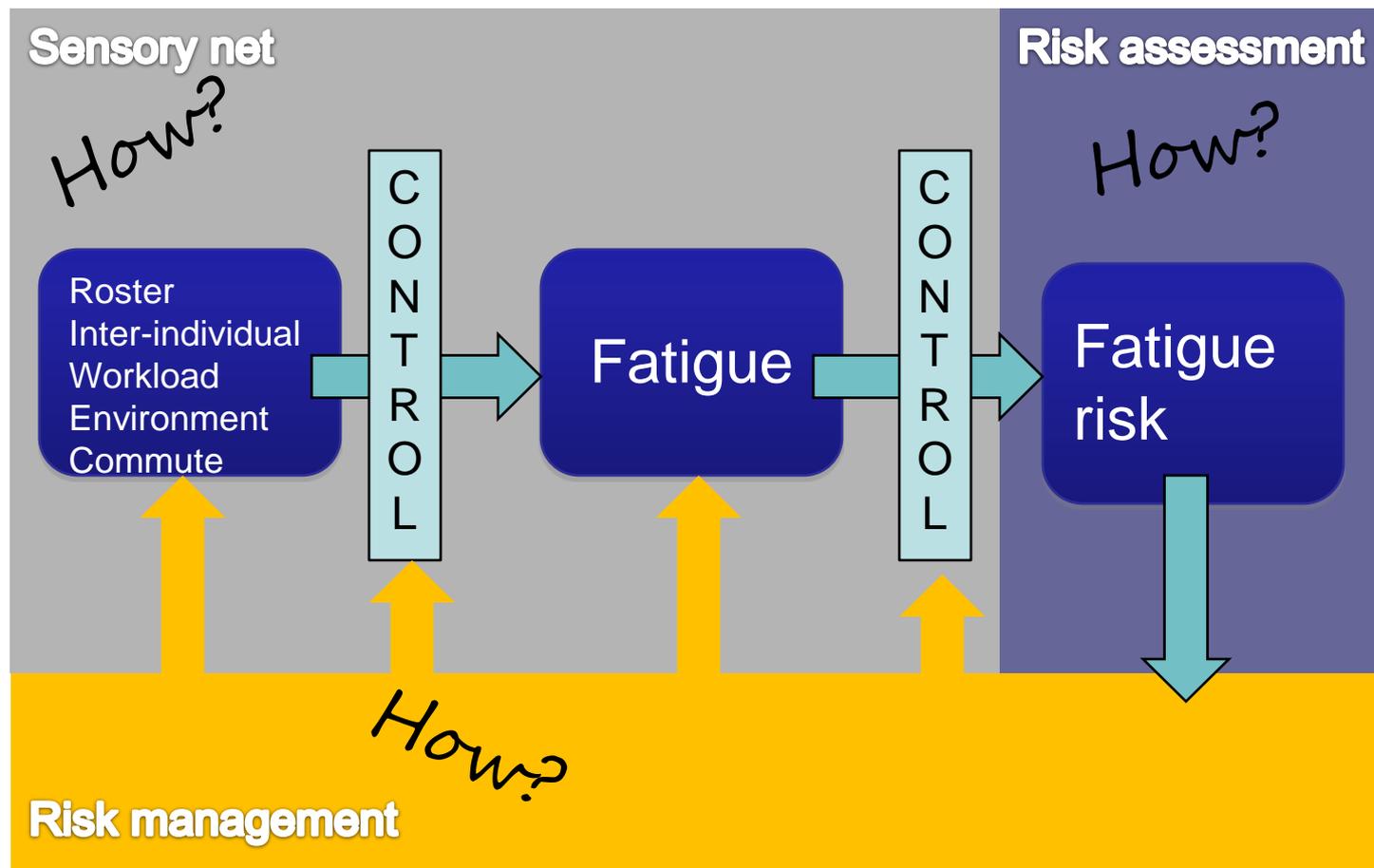
Adapted from Sutton et al. (2003)

Presented at the FAA Fatigue Management Symposium: Partnerships for Solutions; Vienna, VA: June 17-19, 2008

Fatigue Risk Management System

- A fatigue risk management policy;
- A crew fatigue reporting mechanism with associated feedback;
- Procedures and measures for assessing and monitoring fatigue levels;
- Procedures for investigating, and recording incidents that are attributable wholly or in part to fatigue;
- Processes for evaluating information on fatigue levels and fatigue-related incidents, undertaking interventions, and evaluating the effects of those interventions.
- Competency based education and awareness training programmes (organisational learning);
- A performance audit plan (internal and regulatory).

Fatigue risk management





How do you measure fatigue?

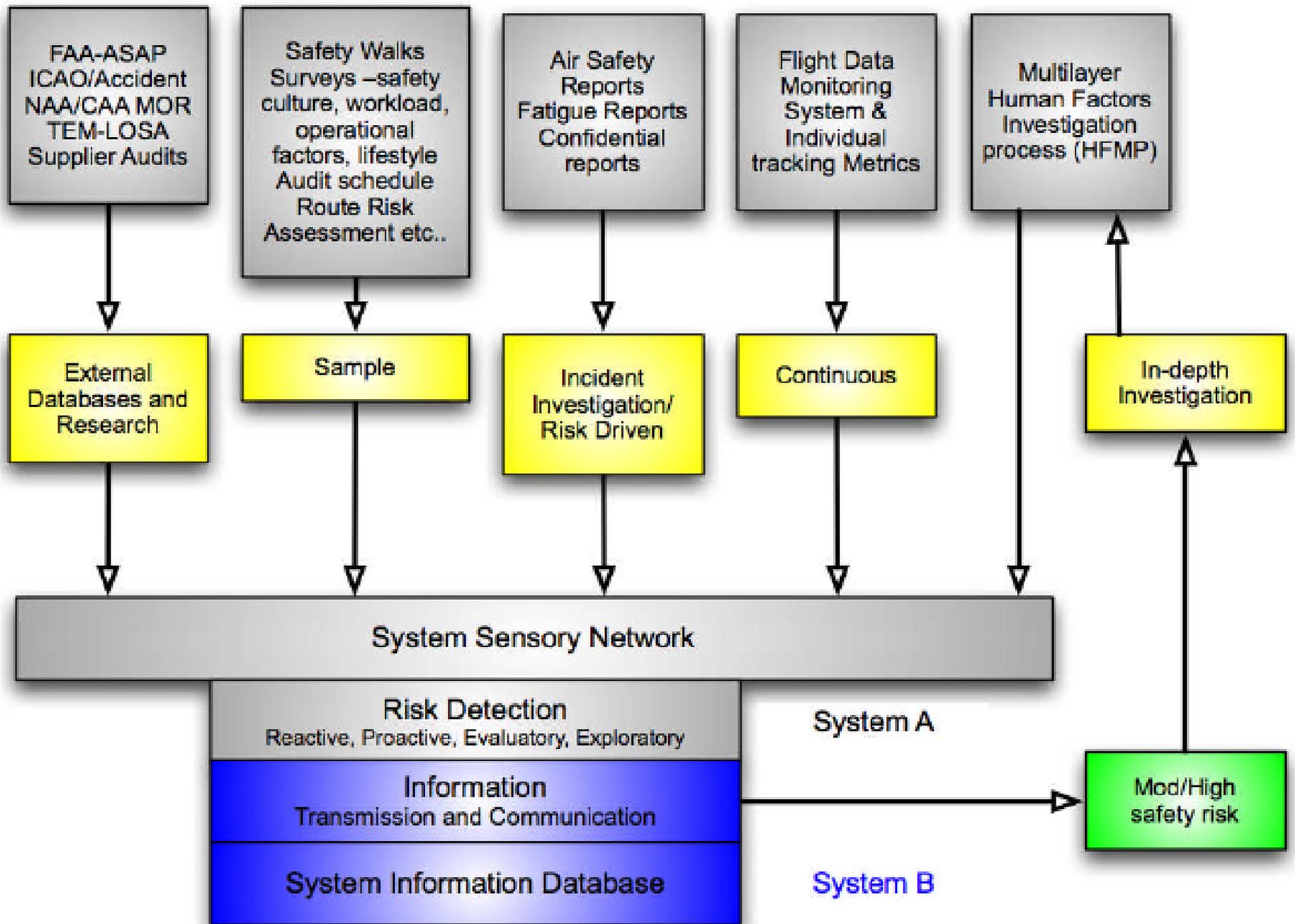
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Safety Data Management Policy

easyJet will maintain an evidence-based Safety Management System that proactively and continuously delivers safety effectiveness and operational integrity within a risk controlled environment.

- Effective **reactive** response to incidents;
- **Proactive** risk analysis to maintain system integrity;
- **Risk trending** that evaluates control strategies;
- **Explore** system risks for future business strategy;
- **Real time** knowledge of System Dynamic Risk;
- Communicate dynamic risk state in **standardised** format;
- All management levels have **clear** understanding of system risk.

This requires the establishment of an open framework of linked databases



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FATIGUE REPORT FORM 1

EZY FRF 1 No: _____

ALL INFORMATION PROVIDED REMAINS STRICTLY CONFIDENTIAL WITHIN THE SAFETY DEPARTMENT

NAME:	RANK:	DATE OF BIRTH (DD/MM/YY):	HOME BASE:	TODAY'S DATE:
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THIS FORM IS BEING COMPLETED IN RELATION TO FATIGUE ASSOCIATED WITH: (TICK ONE)

<input type="checkbox"/> A lodged ASR	<input type="checkbox"/> An FDM event	<input type="checkbox"/> A non-reported safety event	<input type="checkbox"/> A general concern regarding fatigue
---------------------------------------	---------------------------------------	------------------------------------------------------	--------------------------------------------------------------

When did the event occur?	Date (DD/MM/YY): ___/___/___	Time (LOCAL/UTC): _____:_____	How long had you been on duty? _____ HOURS _____ MINS		
What were you doing at the time of the event?	<input type="checkbox"/> In flight	<input type="checkbox"/> Driving to work	<input type="checkbox"/> Driving home	<input type="checkbox"/> Positioning	<input type="checkbox"/> Other _____
If relevant, on what flight did the event occur?	Flight number: _____	Route: _____	Aircraft type _____	Event sector _____	

Duty details:	Early <input type="checkbox"/>	Duty Day: 1, 2, 3, 4, 5, 6 (circle one)	Rostered start time _____:_____ (LOCAL/UTC)	Rostered finish time _____:_____ (LOCAL/UTC)	Duration of commute to & from duty To _____ HRS _____ MIN From _____ HRS _____ MIN
	Late <input type="checkbox"/> (tick one)		Actual start time _____:_____ (LOCAL/UTC)	Actual finish time _____:_____ (LOCAL/UTC)	

Tick all factors that you feel contributed to the event/your general concern	<input type="checkbox"/> Hotel rest	<input type="checkbox"/> Delay(s)	Use this space to provide further detail or to record factors not listed: _____ _____ _____ _____ _____ _____ _____ _____
	<input type="checkbox"/> Home rest	<input type="checkbox"/> Positioning	
	<input type="checkbox"/> Insufficient rostered rest time	<input type="checkbox"/> Commute	
	<input type="checkbox"/> Roster disruption	<input type="checkbox"/> Health	
	<input type="checkbox"/> Early to late transition	<input type="checkbox"/> Long-term fatigue	
	<input type="checkbox"/> Early start time	<input type="checkbox"/> Home issues	
	<input type="checkbox"/> Late finish time	<input type="checkbox"/> Don't know	
	<input type="checkbox"/> Long duty day	<input type="checkbox"/> Other (please add details in the space provided)	

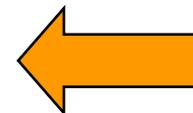
	PHYSICAL SIGNS				COGNITIVE SIGNS		
If you are reporting a specific event rather than a general concern please tick all physical and cognitive signs of fatigue that were apparent in the <u>2 hours</u> leading up to the event	<input type="checkbox"/> NO PHYSICAL SIGNS WERE NOTED <input type="checkbox"/> Fidgeting <input type="checkbox"/> Rubbing eyes <input type="checkbox"/> Yawning <input type="checkbox"/> Frequent blinking <input type="checkbox"/> Staring blankly <input type="checkbox"/> Long blinks <input type="checkbox"/> Difficulty keeping eyes open <input type="checkbox"/> Head nodding <input type="checkbox"/> OTHER: _____				<input type="checkbox"/> NO COGNITIVE SIGNS WERE NOTED <input type="checkbox"/> Increase in slips <input type="checkbox"/> Increase in lapses <input type="checkbox"/> Impaired attention <input type="checkbox"/> Impaired memory <input type="checkbox"/> Negative mood <input type="checkbox"/> Reduced communication <input type="checkbox"/> Impaired problem solving <input type="checkbox"/> Increased risk taking <input type="checkbox"/> Impaired situational awareness <input type="checkbox"/> OTHER: _____		
	How alert did you feel immediately prior to the event (tick one):	<input type="checkbox"/> 1 Fully alert, wide awake	<input type="checkbox"/> 2 Very lively, somewhat responsive, but not at peak	<input type="checkbox"/> 3 OK, somewhat fresh	<input type="checkbox"/> 4 A little tired, less than fresh	<input type="checkbox"/> 5 Moderately tired, let down	<input type="checkbox"/> 6 Extremely tired, very difficult to concentrate
NOTE: IF YOU WISH TO RECORD ADDITIONAL INFORMATION NOT COVERED BY THIS FORM, INCLUDING ANY SUGGESTIONS FOR CORRECTIVE ACTIONS, PLEASE USE THE REVERSE OR ATTACH ADDITIONAL SHEETS. TICK HERE IF ATTACHING ADDITIONAL SHEETS <input type="checkbox"/> NUMBER OF SHEETS ATTACHED _____							

Example FRF investigation data

- Check details of duty for which fatigued
- Check previous duties
- Check duty/flying hrs
- Check night stops away from base
- Check commute times
- Check sickness records
- Run data through predictive model
- Consider hassle factors

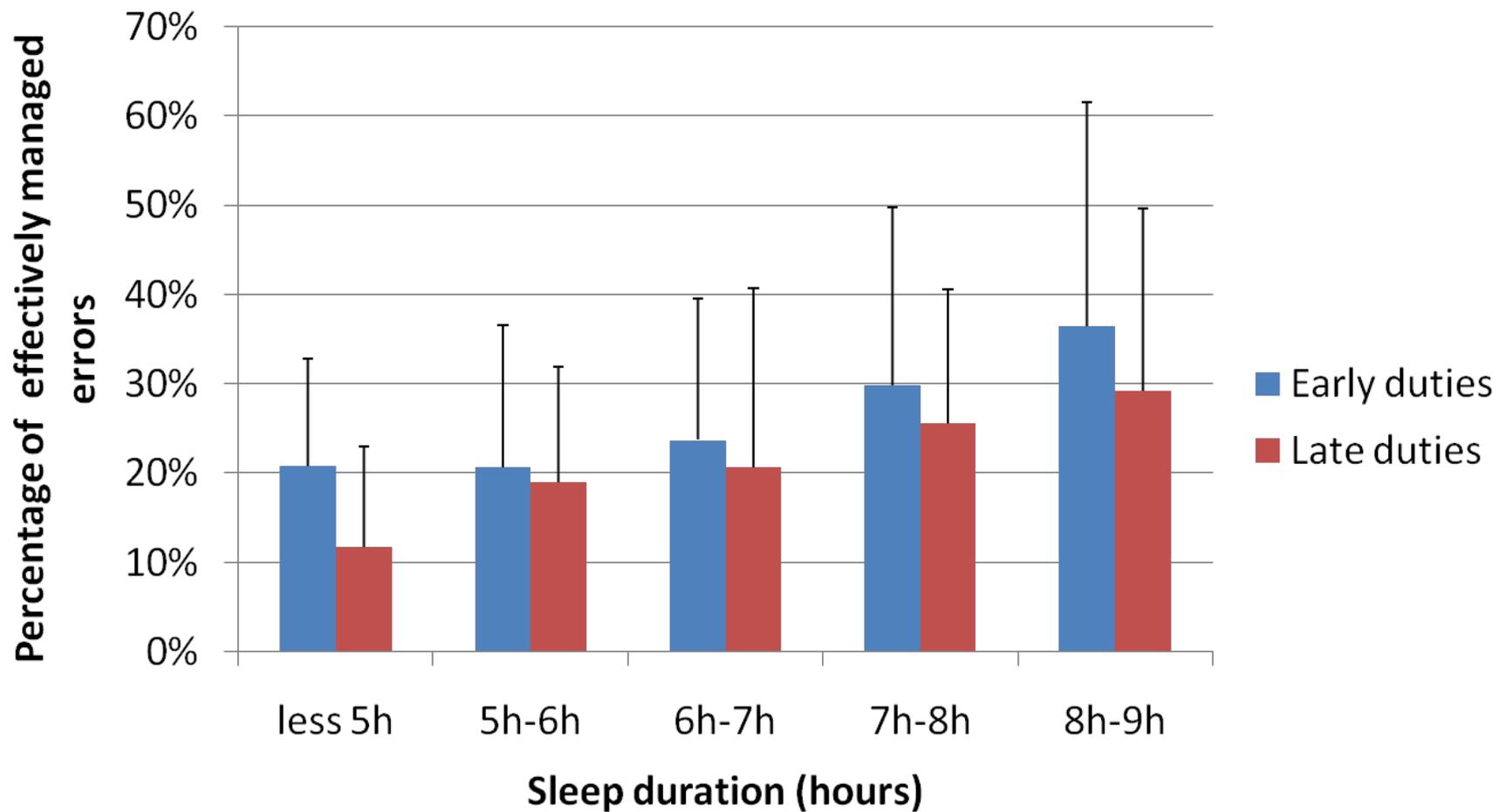
Example fatigue report form data representation

Fatigue Indicators	12 month chart	April	Prev month	3 month	12 month
Commute		8%	7%	5%	6%
Delay(s)		31%	21%	24%	27%
Early Start Time		8%	38%	22%	28%
Early to Late Transition		8%	21%	14%	10%
Health		8%	10%	8%	7%
Home Issues		8%	10%	12%	17%
Home Rest		31%	14%	23%	24%
Hotel Rest		38%	17%	20%	12%
Insufficient Rostered Rest Time		31%	24%	28%	26%
Late Finish		38%	28%	32%	29%
Late to Early Transition		8%	0%	3%	4%
Long Duty Day		54%	55%	59%	54%
Long-Term Fatigue		23%	31%	20%	16%
Positioning		8%	21%	16%	9%
Roster Disruption		38%	24%	26%	23%



Crew cited contributors to fatigue

Sleep and error management



easyJet HFMP study 2008

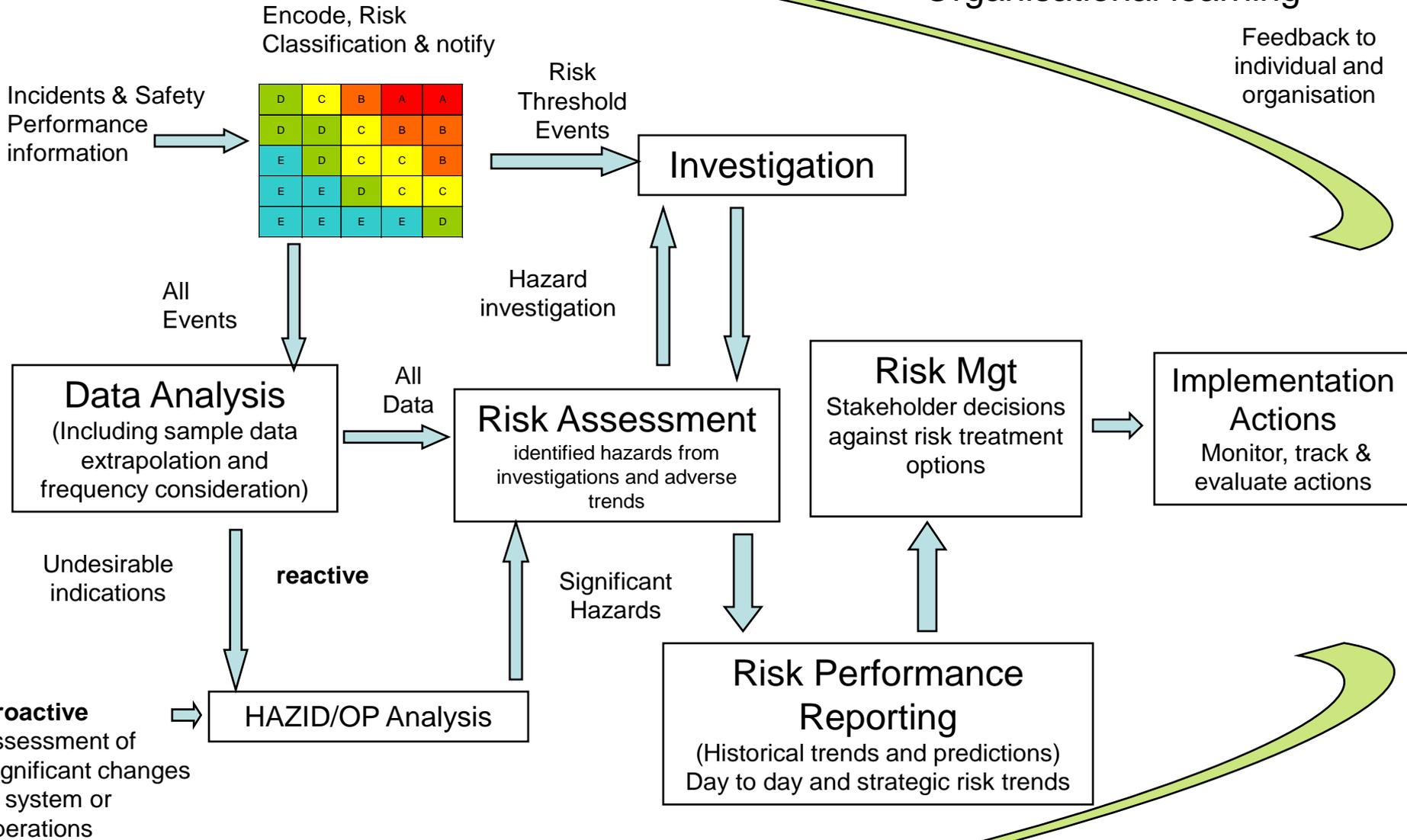
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How do you assess fatigue risk?

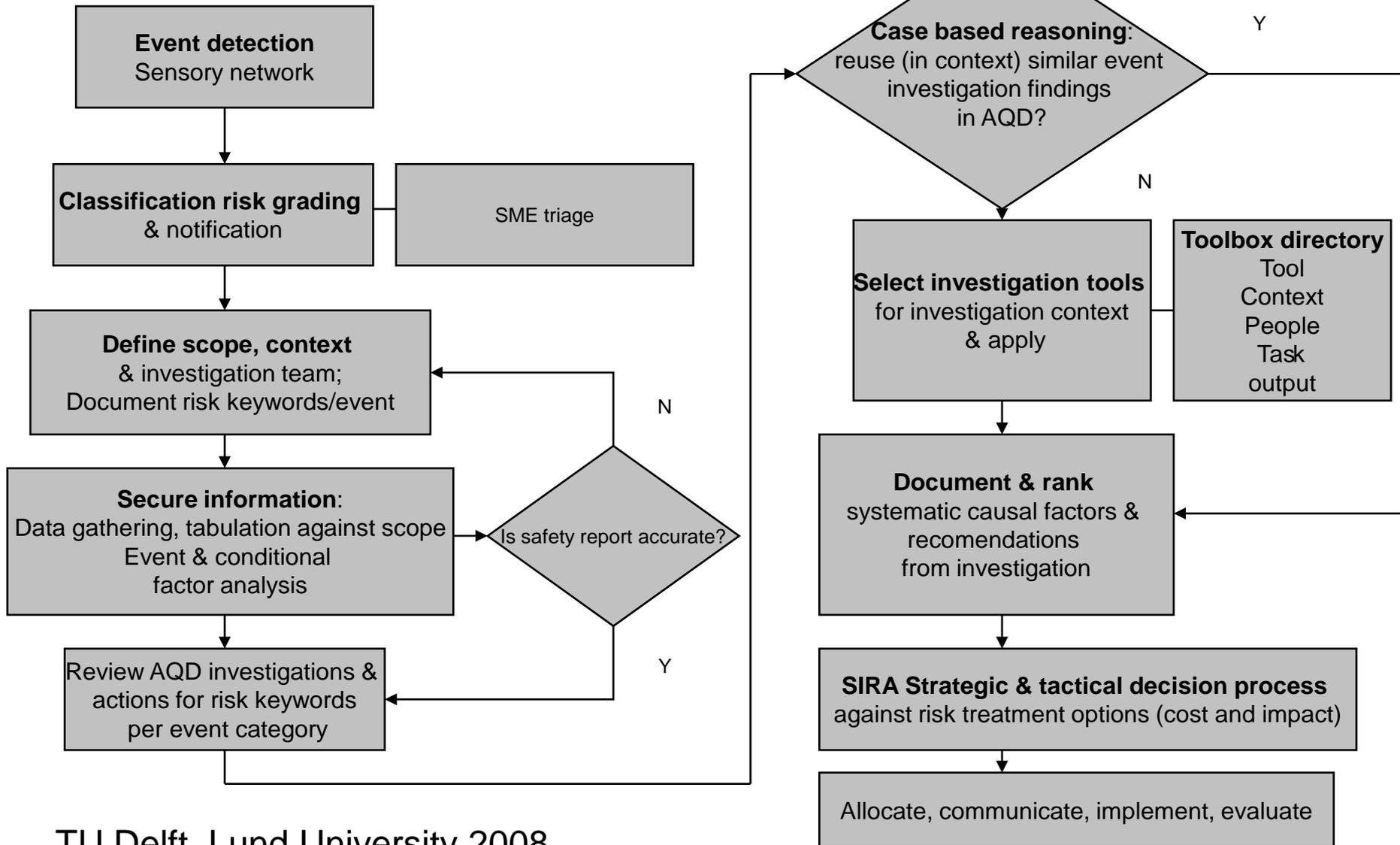
Organisational learning

Feedback to individual and organisation

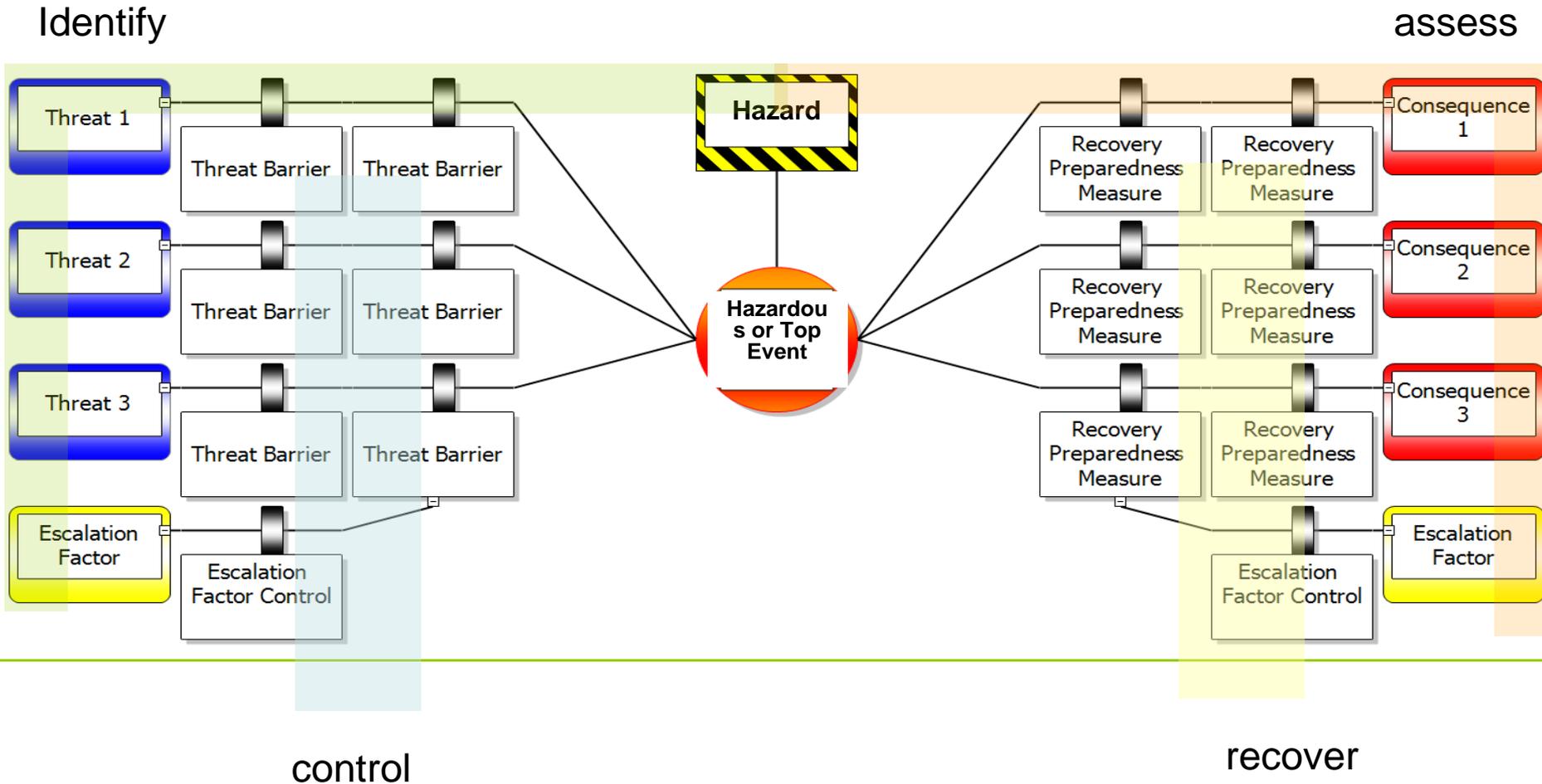


EVENTS will be investigated, systemic causal factors analysed

SIRA© Investigation process



Bowtie Model: Barriers and controls of fatigue risks are examined



Team will allow management to assess options and rank risks for continuous improvement

People, environment, assets, reputation

	Consequence				Frequency				
					A	B	C	D	E
Severity	People	Environment	Assets	Reputation	<i>Never heard of in industry</i>	<i>Has occurred in industry</i>	<i>Has occurred in company</i>	<i>Occurs several times per year in company</i>	<i>Occurs frequently in company</i>
0	<i>No injury</i>	<i>No effect</i>	<i>No damage</i>	<i>No impact</i>	Manage for continuous improvement				
1	<i>Slight Injury</i>	<i>Slight effect</i>	<i>Slight damage</i>	<i>Slight impact</i>					
2	<i>Minor injury</i>	<i>Minor effect</i>	<i>Minor damage</i>	<i>Limited impact</i>	Incorporate risk reduction measures			Intolerable	
3	<i>Major injury</i>	<i>Localised effect</i>	<i>Localised damage</i>	<i>Considerable impact</i>					
4	<i>1-3 fatalities</i>	<i>Major effect</i>	<i>Major damage</i>	<i>National Impact</i>	Intolerable				
5	<i>multiple fatalities</i>	<i>Massive effect</i>	<i>Extensive damage</i>	<i>International impact</i>					



How do you manage fatigue risk?

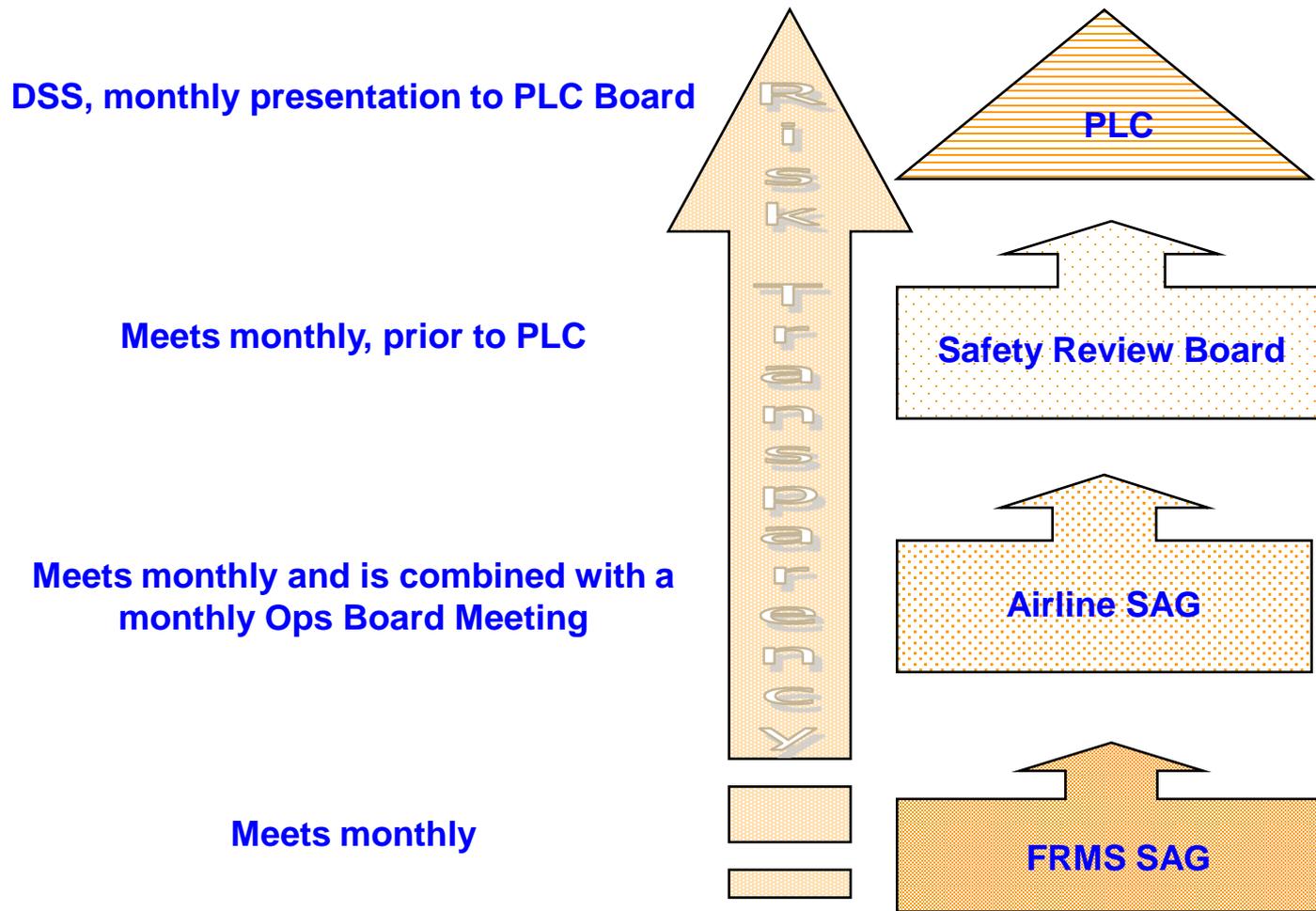
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Fatigue Awareness and Countermeasures Training (FACT)

- c.1800 pilots have completed the online FACT programme
- Competency tested online and records kept for audit purposes
- FACT continuously updated to reflect research and operational risks
- Adapted to suit managers, rostering staff, cabin crew, engineering etc

Critical information pathways delivering risk transparency to senior management



Safety is our number 1 priority

FRMS Ongoing Risks

Very High	High	Medium	Low	Very Low
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<u>Risk Name</u>	<u>Risk Summary</u>	<u>Risk Owner</u>	<u>Identified (date)</u>	<u>Estimated Closure</u>	<u>Risk Grade</u>

The risk evaluation team that ensures safety & quality oversight criteria are met and standardised



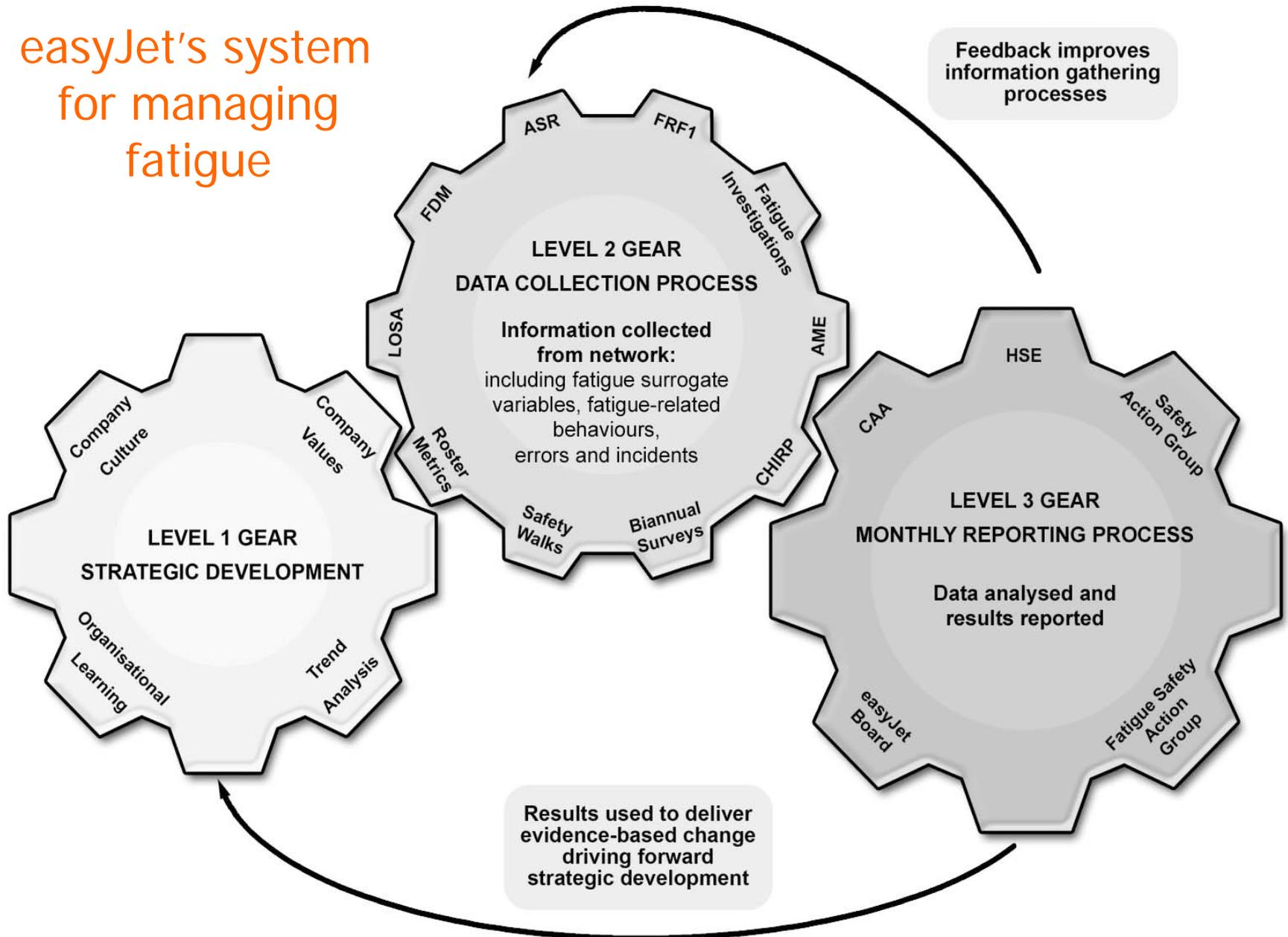
Ensures Regulatory Compliance – current and future

Evaluate risk identified from FRMS investigations and regulation against system operation (impact & cost, efficiency, safety & performance criteria)

Is compatible and capable with the business model (operational readiness)

Facilitates evidence-based decision making

easyJet's system for managing fatigue



Achieving commercial objectives



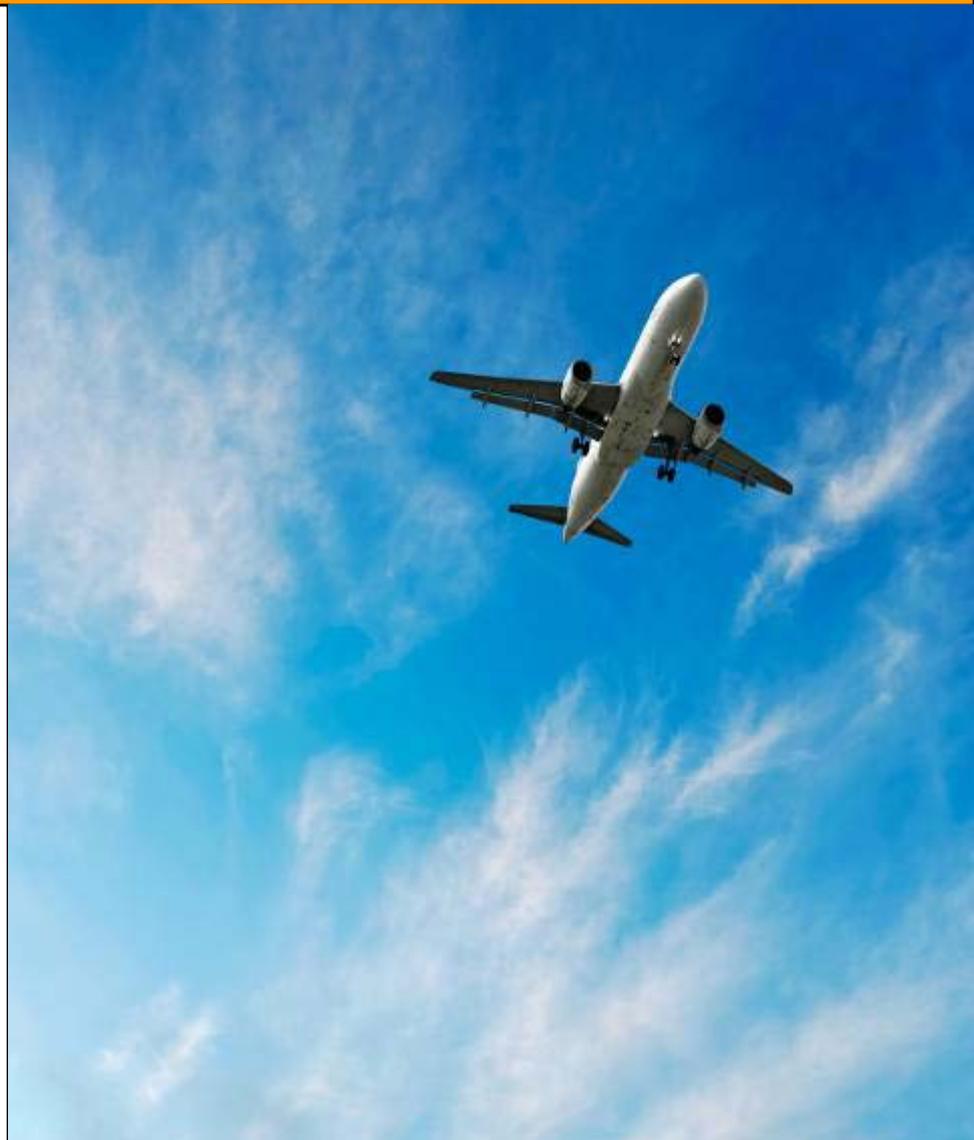
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Minimising loss through risk management

We will have our risks mapped out

Makes us more efficient and safer

Creating added value through optimised rostering solutions based on improved crew resource utilisation supported by evidenced safety criteria



Biographies

Captain Simon Stewart

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Head of Strategic Safety Development, easyJet Operations Risk Group

Simon is currently the Head of Strategic Safety Development at easyJet. Prior to that role he was the easyJet Flight Operations and Safety Manager for three years. He is responsible for the development and implementation of easyJet SMS systems, of which the FRMS is an integral component.

Alexandra Holmes Ph.D.

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Research Director, Clockwork Research Ltd

Alex is a fatigue specialist and Research Director at Clockwork Research, a London-based company providing fatigue risk management services to the aviation industry. She assists short-haul and long-haul airlines and business operators to introduce operational processes for managing fatigue inclusive of FACT (fatigue awareness and countermeasures training), fatigue reporting systems, fatigue risk assessment and monitoring techniques.