Fatigue Risk Management at SWISS

Version 1.0, prepared August 2015

Loukia Loukopoulou, Ph.D.
Human Systems & Performance, Manager
Flight Safety
SWISS International Air Lines

SASCON 2015
8 September

FRM at SWISS

Fatigue Risk Management

EU Commission Regulation (EU) No. 83/2014 : 18 Feb 2016 (1 Feb for SWISS)

For SWISS, **Fatigue Risk Management** is a:

1. **Standard for Safety**: match and exceed industry best-practices

2. **Requirement**: Training

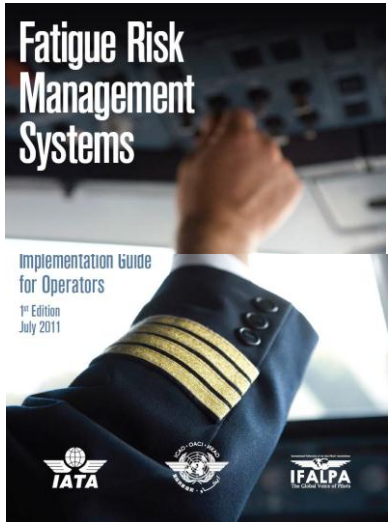
3. **Option**:

   - Continue current operations that become “illegal” under new Regulations (today)

   - Take advantage of “benefits” (anytime, from here on)
     - Maximum FDP for crew in unknown state of acclimatisation
     - Maximum FDP for night duties not limited to 10:00 hours
     - Reduced rest

⇒ **Increase Safety AND Productivity**
- Optimize of schedules wrt crew alertness
- Improve job satisfaction, morale
- Reduce costs (absences, sickness rate, incidents, insurance premiums)

FRM at SWISS



SMS

FRMS

Documentation

Risk Management

1

2

FSAG

4

3

Promotion

Assurance

FRM at SWISS

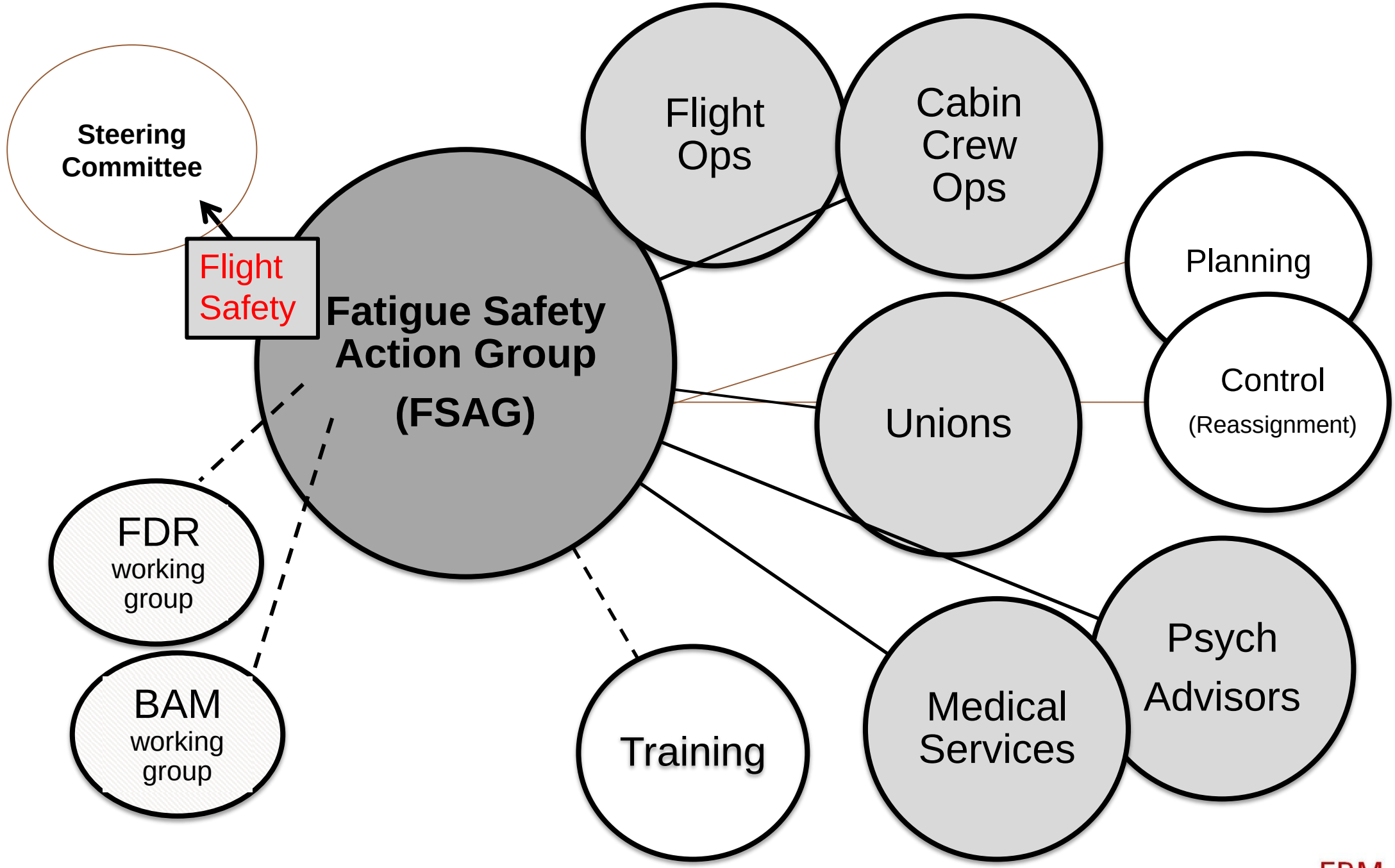
Starting Point

Start 2013

- launch initial implementation for flight and cabin crew
- to be extended to other business areas
- (at that time) no legal requirement, just being proactive.

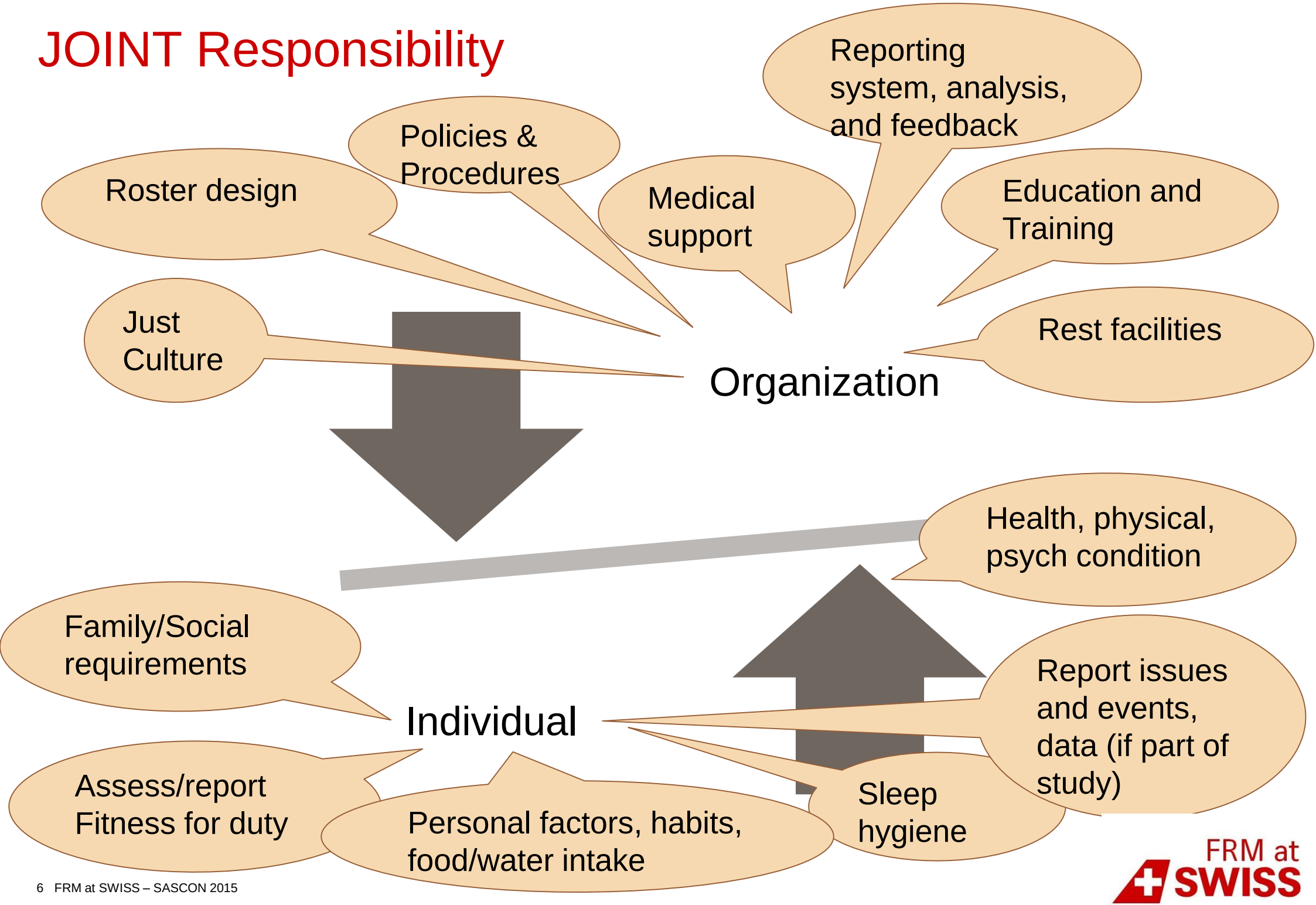
3 key messages:

1. Fatigue Management is a JOINT RESPONSIBILITY!
2. Fatigue Management, to some extent, involves a biomathematical model approach
3. Fatigue Management is mostly about SMS risk management processes


Steering Committee
Flight Safety
Fatigue Safety Action Group (FSAG)
Flight Ops
Cabin Crew Ops
Planning
Control (Reassignment)
Unions
FDR working group
BAM working group
Training
Medical Services
Psych Advisors

FRM at SWISS

JOINT Responsibility



FRM at SWISS

FATIGUE definition

"A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness and/or physical activity that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety related duties."

[IATA/ICAO/IFALPA, 2011]

OPERATIONAL FATIGUE*

Sources

- Structure of pairings/rotations
- Timing and quality of in-flight or layover rest and rest facilities
- Timing and quality of breaks and meals

Outcomes

- Degraded ability to perform duties
- Inadvertent errors/omissions/deviations
- Calling in "sick" (not fit for duty)

** Non-operational fatigue and personal issues should continue to be communicated using the available channels, e.g., duty officer, fleet office, team leaders, medical and psychological services.*

FRM at SWISS

The concept of Managing "Fatigue"

CONTRIBUTING FACTORS
SOURCES of Hazard?

HAZARD
What ENDANGERS operations?

OUTCOMES
How does HAZARD express itself?

CONSEQUENCES
How are OUTCOMES manifested?

CHECKLIST

Sources of FATIGUE in flight operations (science, industry)

- ☐ Time of Day
- ☐ Time on Task
- ☐ Sleep Quantity/Quality
- ☐ Time zone acclimatization
- ☐ Exposure to light
- ☐ Workload / Complexity of duty
- ☐ Nutrition & Hydration

(not in order of priority)

FATIGUE

Reduce FDP
Educate crews
Program InFlight Rest
Changes to Schedule, etc..
MITIGATION actions

FATIGUED pilot

FATIGUED cabin crew member

?

coffee
rest in flight
delay crew call
etc...
BARRIERS

Degraded PERFORMANCE
-procedural lapse
-decision error
-communication issue
etc.

-long landing
-level bust
-inadv slide deploymt
etc.

FRM at SWISS

Status (August 2015)

BASIS	FSAG	
Documentation		Policy OMM “local” documents
Risk Management		Processes, per SMS SPIs Scientific principles Tools (e.g., Contributing Factors Checklist; CONCERT)
FRM Promotion		Training Intranet Publications
FRM Assurance		*TBD*

FRM at SWISS

FRM at SWISS: target Feb 2016

BASIS	REACTIVE FRM	PROACTIVE FRM	PREDICTIVE FRM
Documentation	SRS reports: Monthly reviews by Flight Safety => FSAG, SAG, Flight/Cabin Crew Management, SSB	Apply BAM to published schedules: alertness optimization	Explore improvements to current SWISS FDRs *(CONCERT)*
Risk Management	Fatigue Report Form	Continuous monitoring of produced schedules: - trending of SPIs/KPIs - automatic alerts *(CONCERT)*	
	Comparison of produced vs. flown schedules *(CONCERT)*	FRM tips to crews (pairing/rotation-specific)	
FRM Promotion	Assess specific pairings/rotations/equipment *(BAM, CONCERT, in-flight study, survey, SRS reports)*	Anticipate changes: pairings/rotations/equipment *(CONCERT, BAM)*	
FRM Assurance			

Flight Safety

LINE MANAGEMENT UNITS

(note: each unit has a representative at the FSAG)

Fatigue Safety Action Group FSAG

-share
-align
-track
-escalate
(if necessary)

Flight Safety support (as required)

FATIGUE RISK MANAGEMENT

1. Identify issues
2. Discuss factors contributing to fatigue
3. Develop mitigations
4. Take action
5. Track implementation and effectiveness

- SWISS Int'l (A330/A340)
- SWISS Global
- SWISS Int'l (A320)
- Cabin Mgmt
- Cabin Mgmt GVA
- Crew Planning/Control
- Unions

FRM at SWISS

FRM at SWISS: target Feb 2016

BASIS	REACTIVE FRM	PROACTIVE FRM	PREDICTIVE FRM
Documentation			
Risk Management			
FRM Promotion			
FRM Assurance	Examples… ***Line Management units need to be in the lead (with Flight Safety and FSAG support)***		

FRM Toolbox

- SWISS Reporting System (SRS)
- Risk Management Processes (SMS)

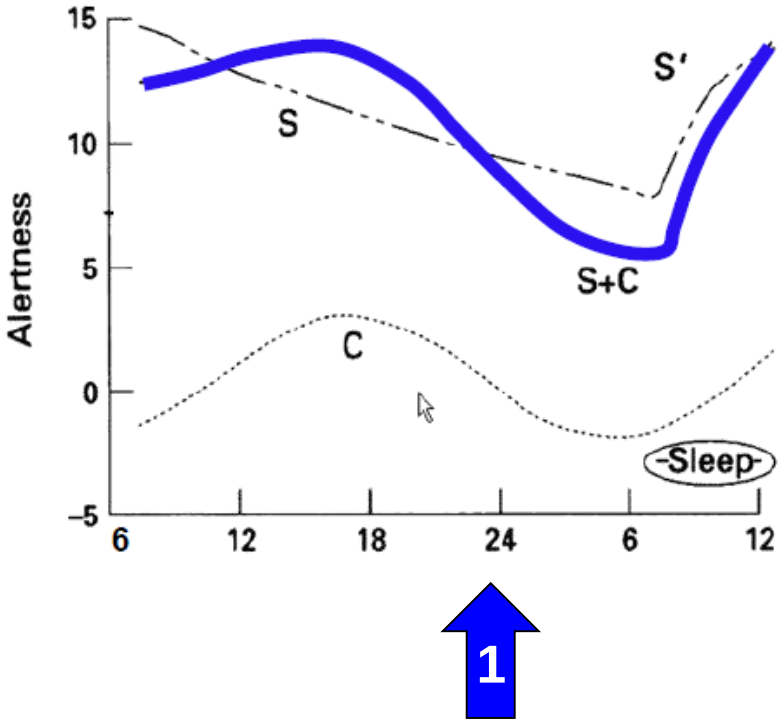
- Boeing Alertness Model (BAM)
- CONCERT
- Crew Alert application on iPad/iPhone

SRS reports and SPIs

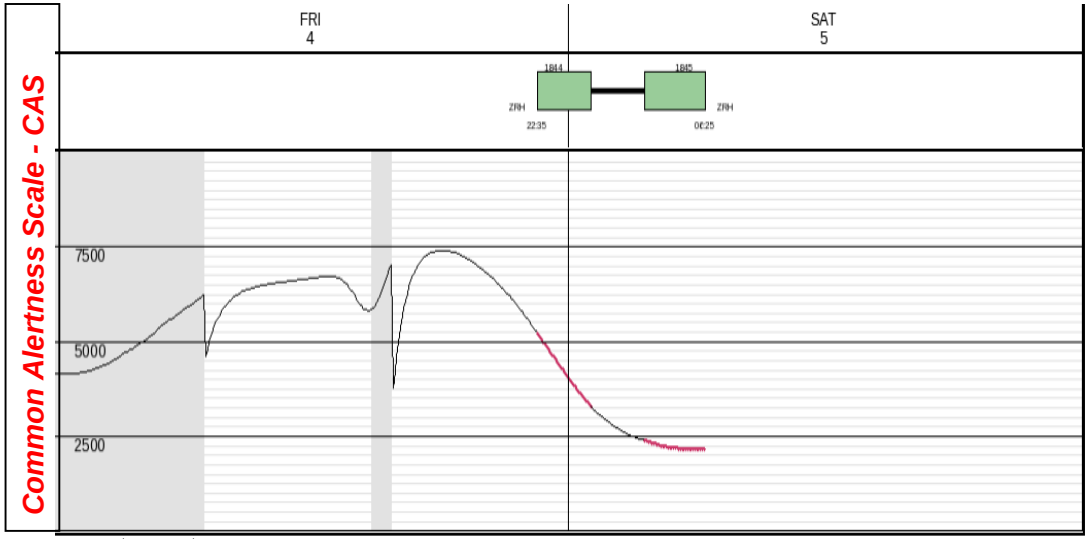
Examples from monthly query of reporting database (SRS) for fatigue-related reports, analysis, and presentation of SPIs.

Biomathematical models - Boeing Alertness Model (BAM)

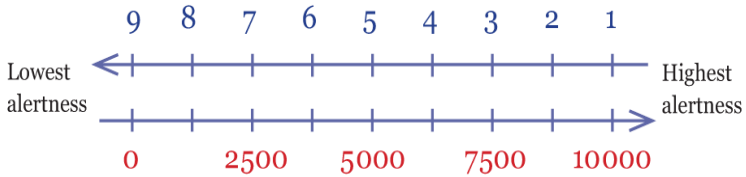
Based on human physiology (Åkerstedt, Folkard)
Validated with operational data



2



The Common Alertness Scale - CAS



The Karolinska Sleepiness Scale - KSS

1 Very alert
2
3 Alert – normal level
4
5 Neither alert nor sleepy
6
7 Sleepy, but no effort to keep awake
8
9 Very sleepy, great effort to keep awake

Input
Duty schedules
Sleep times (if available)
Constraints (e.g., reporting time, transportation time)
Output
Predicted level of alertness over time
Focus: TOD (top of descent)

Alertness evaluations and Optimization runs

Examples from the evaluation of Pairings and Rosters
Examples of Optimization runs, producing alertness-sensitive schedules and comparison with current schedules.

CONCERT

JEPPESEN
A BOEING COMPANY

State of the art tool to **visualize**, **monitor, and control:**

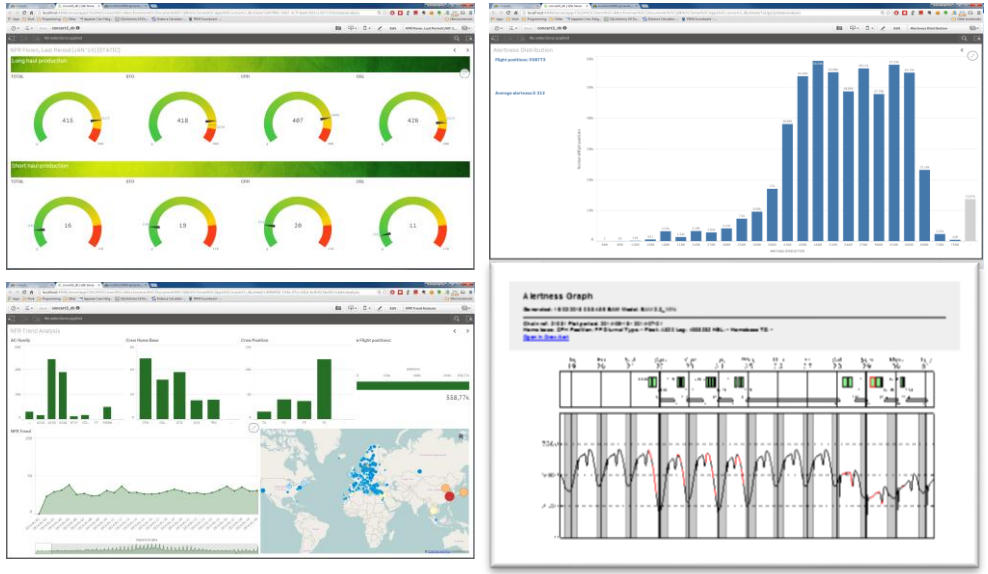
- Alertness (fatigue)
- Productivity

Input:

- Data from JPC/JCR (planned, scheduled, flown): regular, automatic feeds
- Biomathematical model (BAM) to predict alertness (flight and cabin crew)
- SWISS-defined SPIs (OSF: fatigue) and KPIs (OEP: productivity)

Output: Dashboard for data presentation & user-friendly, fully customizable interface:

- Real-time monitoring of trends
- Drill-down from “big picture” to single case
- Investigation of specific cases (input into CrewAlert on the iPad): options, countermeasures
- Timely identification of issues: automatic alerts
- Measurement of effectiveness of actions
- Exploration of large-scale “what-if”s



FRM at SWISS

CONCERT - examples

Examples of monitoring alertness trends in Planned schedules (“big picture”)
Example of investigation into specific pairing, potential improvement, suggestions for FRM for crew (“drill down to single case”)

Summary

Status

Challenges

Obstacles

The way ahead.

FRM at SWISS

Thank You

FRM at SWISS