

ICAO APAC AIG Workshop

Hide and Seek

- Games humans like to play

*Human Factors considerations
in Accident and Incident Investigation*

The Human Contribution

Do we know how much ?

80%

90%

100%

Science
Discipline
Knowledge
Capabilities
Limitations
Performance

Physical
Psychological
Environment
Risk
Complexity

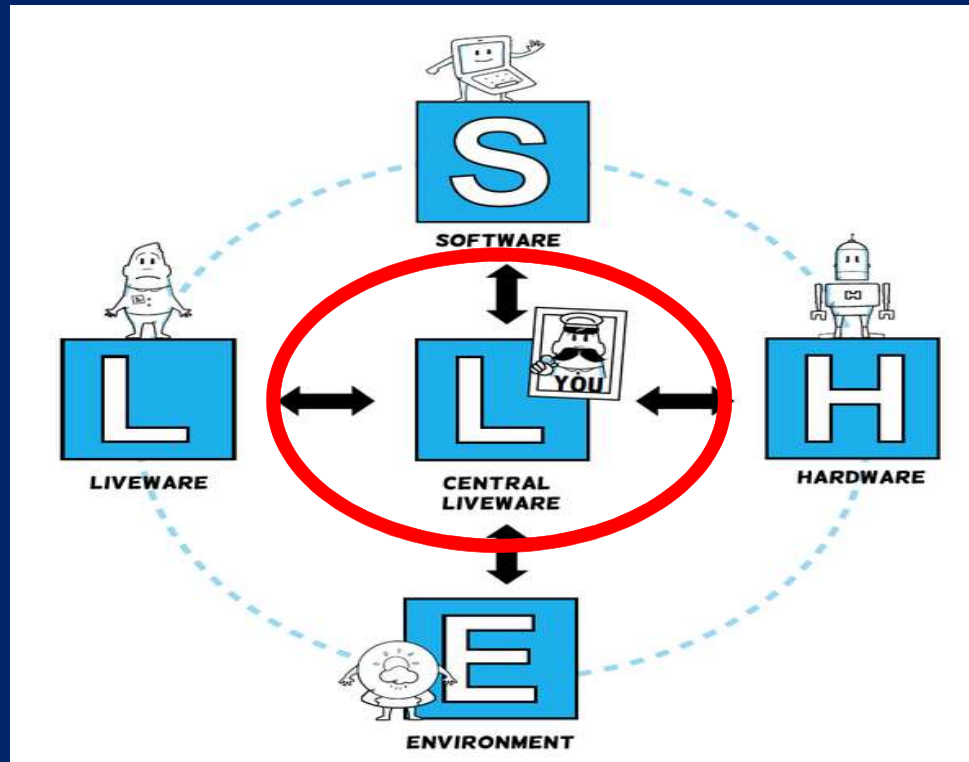


Design
Operations
Maintenance
Products
Systems

Safety
Productivity
Effectivity
Efficiency

Human Factors Complexity

The focus on Human Factors



It's all about you.

NOISE

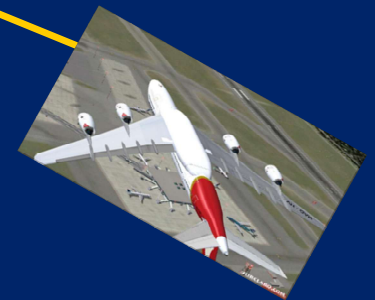


SLEEP



ADDICTION

SPATIAL
DISORIENTATION

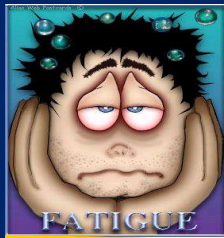


COLD



Human
Perf
Limits

FATIGUE



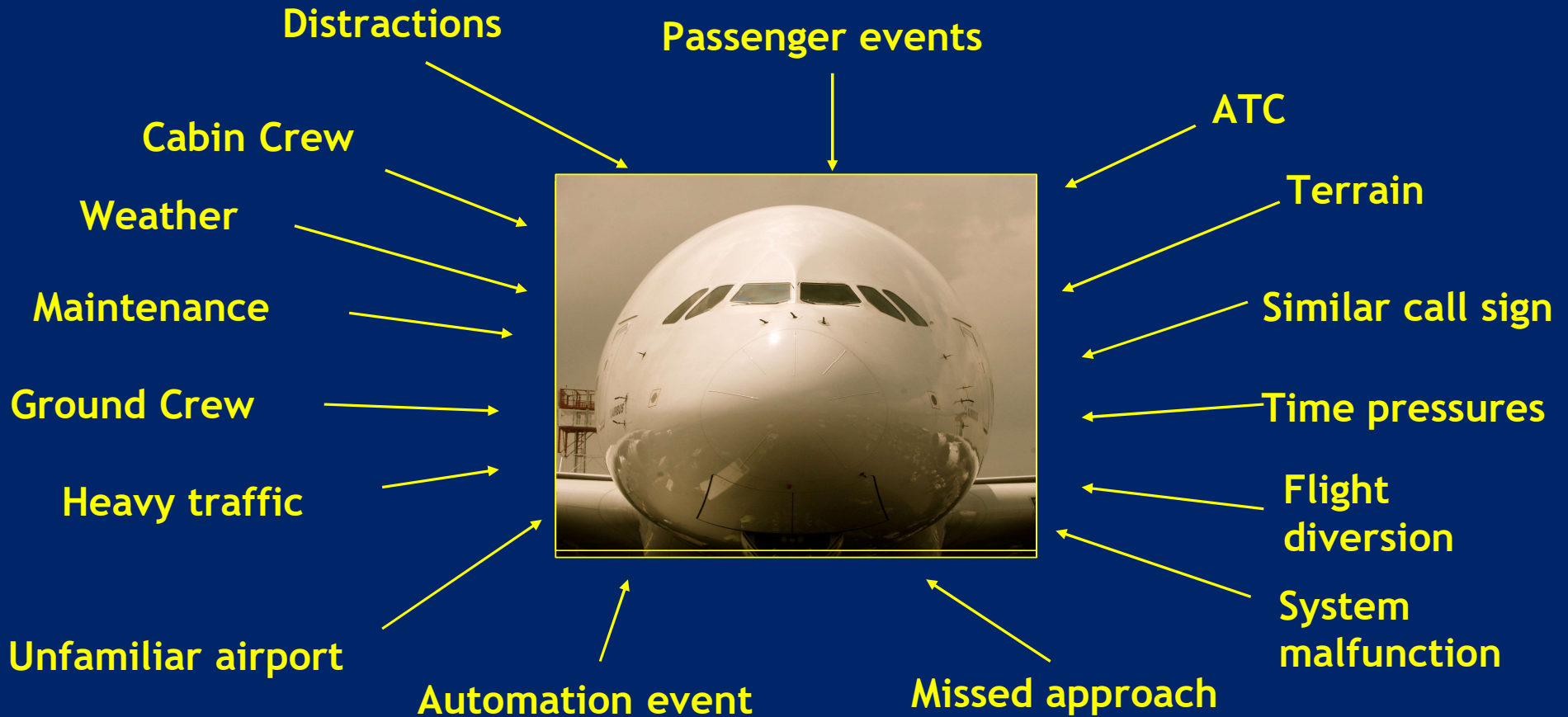
STRESS



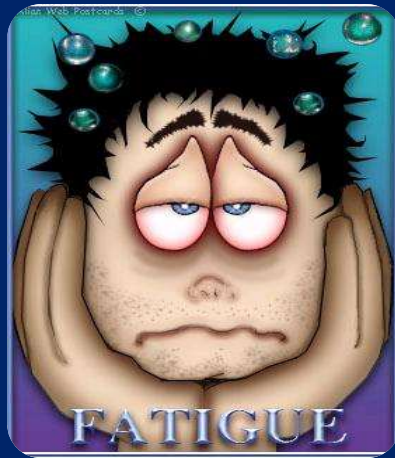
HEAT



The Influences on HPL continues



Human Performance Limitations - Recognition and Management



A couple of examples.....



FATIGUE

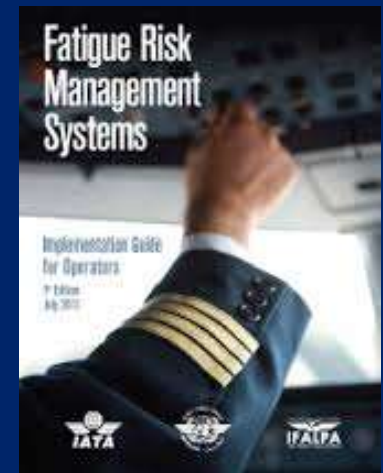
Fatigue Symptoms



Physical
Mental
Emotional

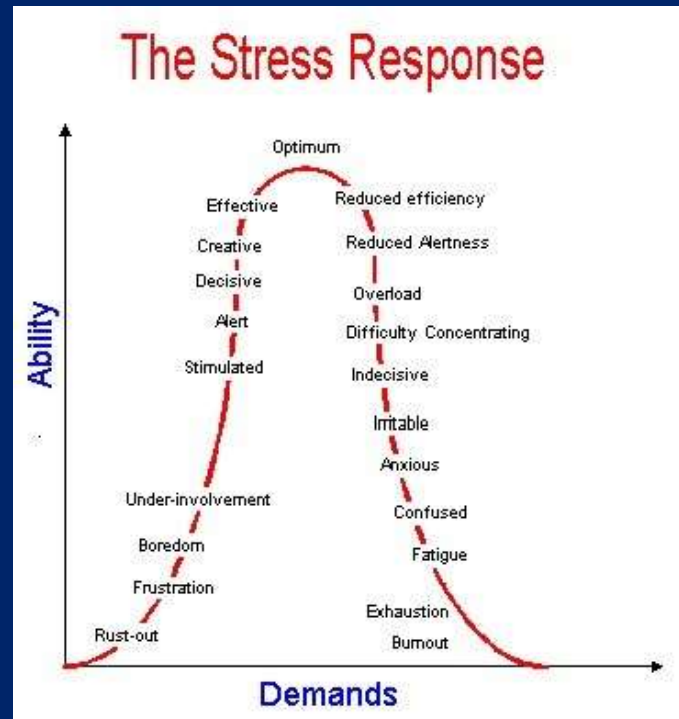
Fatigue Management Strategies

- CONFESSION
- MONITORING
- CROSS CHECKING
- TASK ROTATION
- BREAKS
- COFFEE
- NAPPING
- SLEEP.





Stress ??



Stress Reduction Kit

Bang Head Here

Directions:
1. Place kit on FIRM surface.
2. Follow directions in circle of kit.
3. Repeat step 2 as necessary, or until unconscious.
4. If unconscious, cease stress reduction activity.

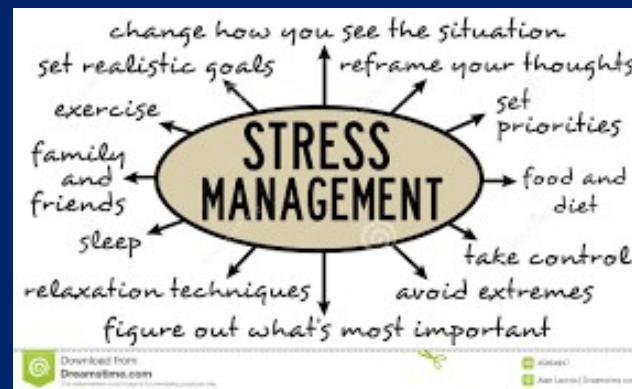
STRESS RELIEF

Handy In Times Like These

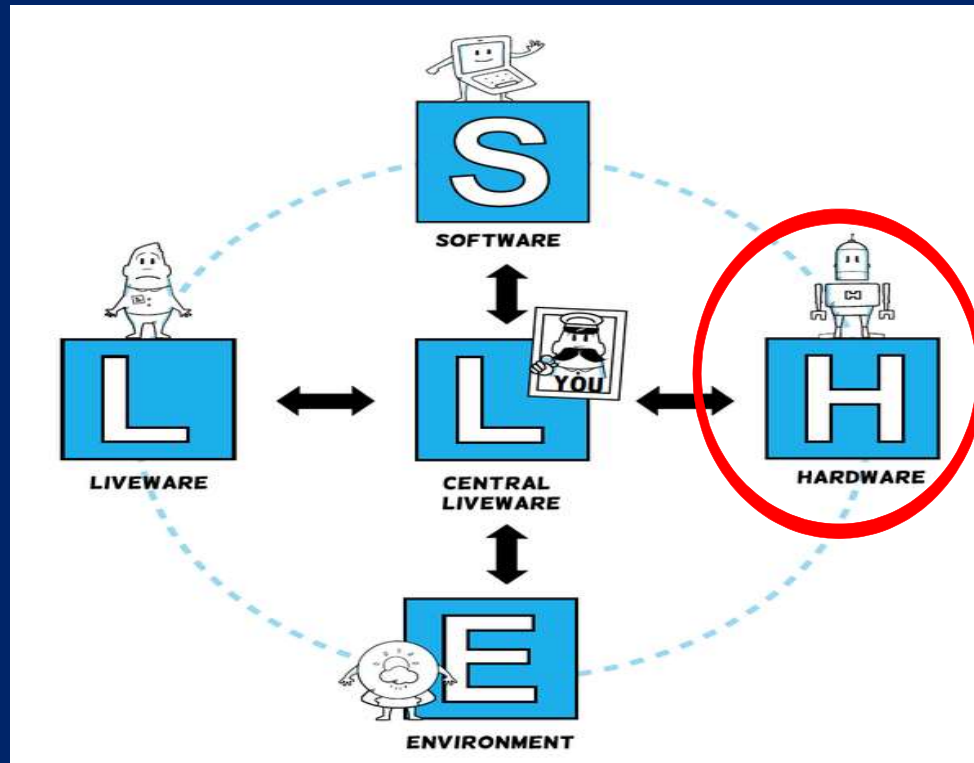
motifake.com

Stress Mitigation

Remove Stressors
Exercise
Seek Help



Liveware - Hardware



The era of the machines ?

Man and Machine



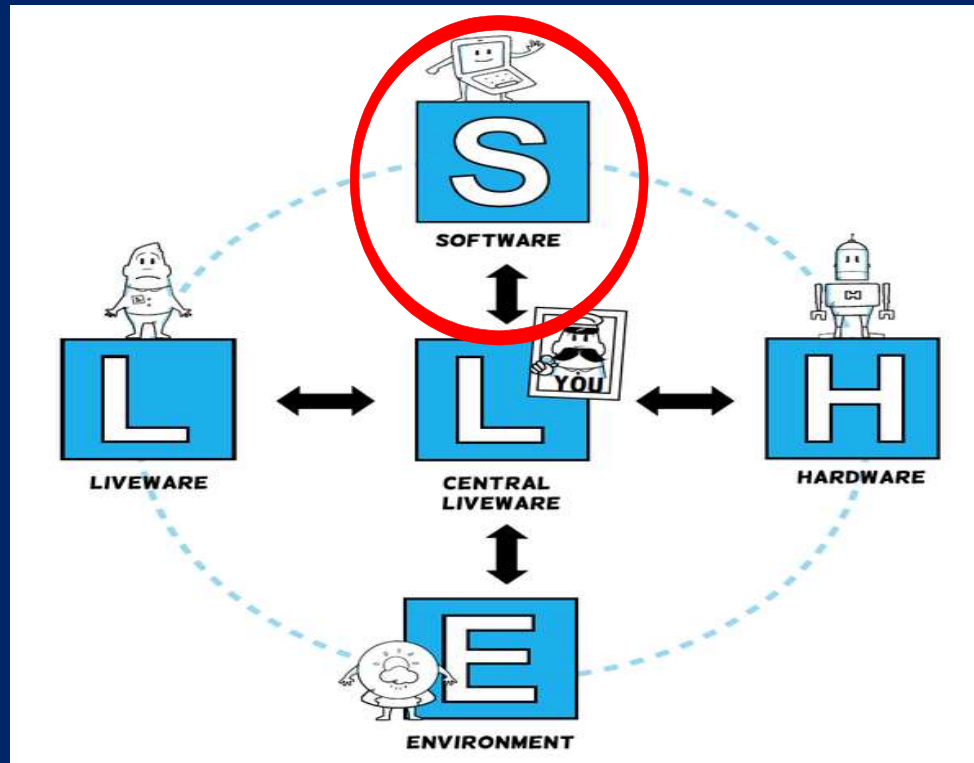
Human and Machine

The Challenges

- Boeing v Airbus
- Design / Ergonomics
- Complexity v Simplicity
- Interface / Communication
- Speed / Efficiency
- Redundancy / Reliability.

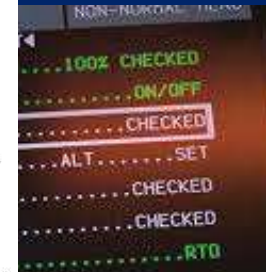
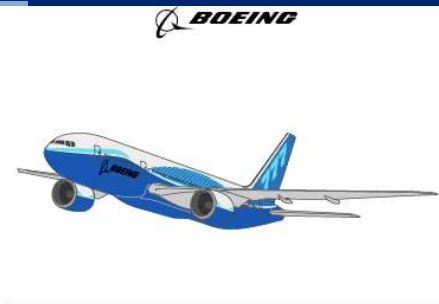
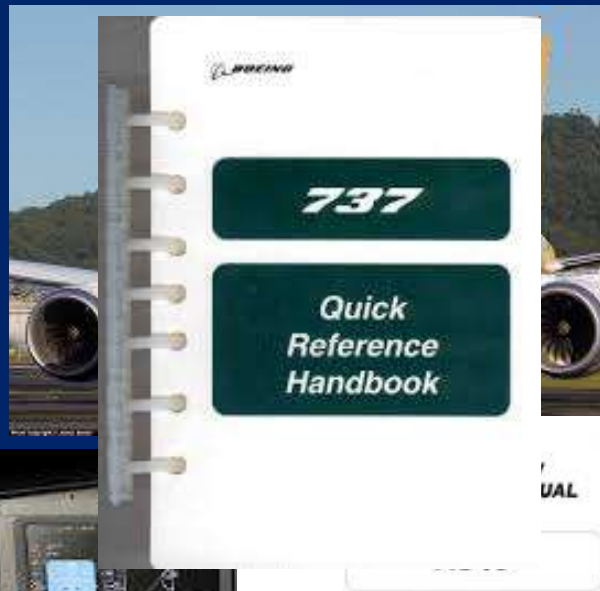


Liveware - Software



Can we know it all ?

Human and Software



Fl SIMU F.P.S.3 UP for training only STD 13.1

 A320 <small>MODEL 320X</small> <small>PILOT'S OPERATING MANUAL</small>	AUTO FLIGHT		1.22.40	P 4
	FLIGHT AUGMENTATION		SEQ 001	REV 24

FLIGHT ENVELOPE FUNCTION

As long as one Flight Augmentation Computer (FAC) is valid, it governs the flight envelope function, the rudder position display, and the rudder trim indication regardless of what the pilot does with the FAC pushbutton.



FMGS PILOT'S GUIDE

4

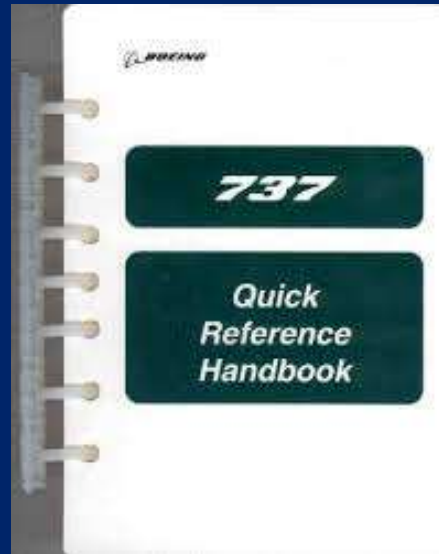
AIRBUS

Island Enterprises



Human and Software - Challenges

Training Methodology
Design Complexity
Data Overload
Digital Age
Connectivity
SOP
Checklists
Communications.



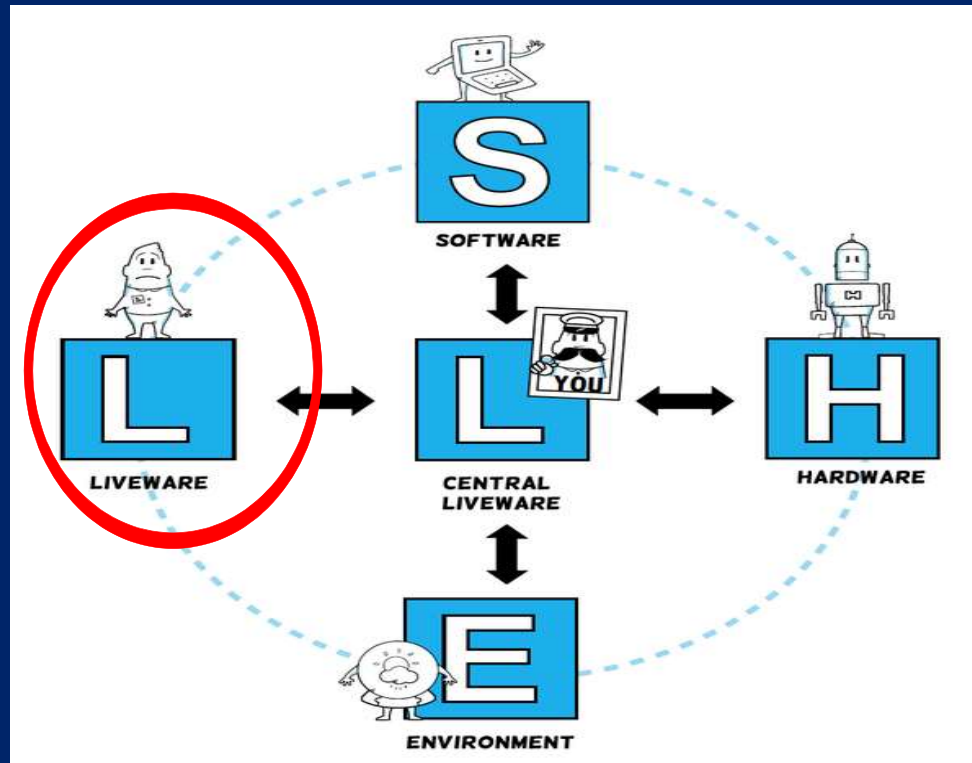
MU F.P.S.3 UP for training only STD 1.3.1

EX-TRAINING A320 PILOT'S FLIGHT CREW OPERATING MANUAL	AUTO FLIGHT FLIGHT AUGMENTATION	1.22.40	P 4
		SEQ 001	REV 24

FLIGHT ENVELOPE FUNCTION

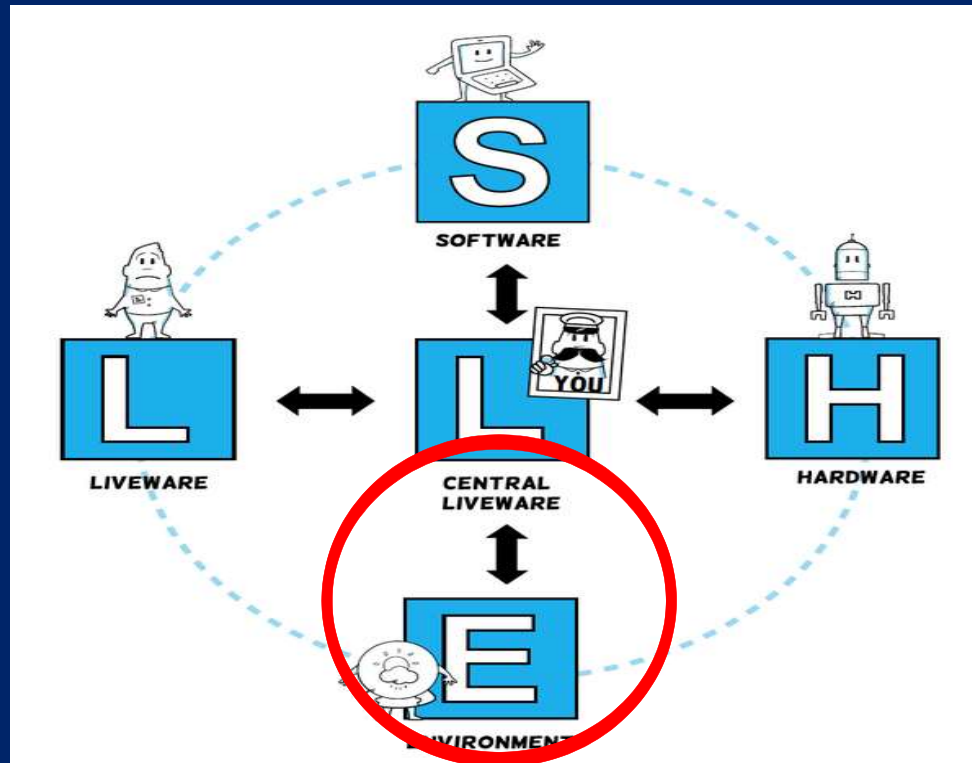
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Liveware - Liveware



The most challenging interphase

Liveware - Environment



The world we work and live in

Human and the Environment

- Technological Environment

- *Design*
- *People*
- *Etc...*

My Office 1995



My Office 2023



- Physical Environment

- *Weather*
- *Air Traffic*
- *Etc...*



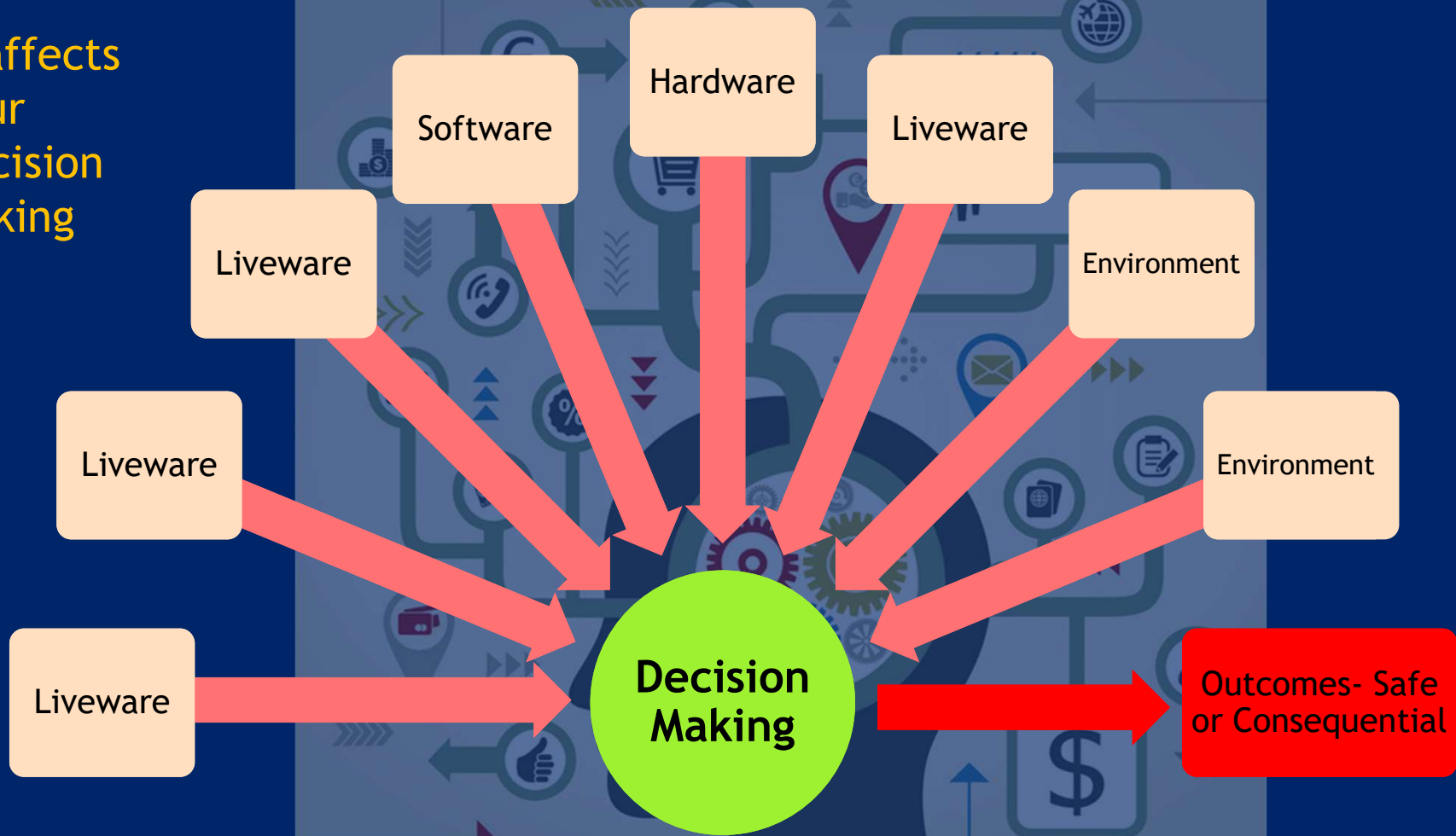
- Organisational Environment

- *Climate*
- *Labour Issues*
- *Etc...*

How does this affect you?

It affects your goal of
SAFETY,
EFFICIENCY
and
EFFECTIVITY
in your mission.

It affects
your
Decision
Making

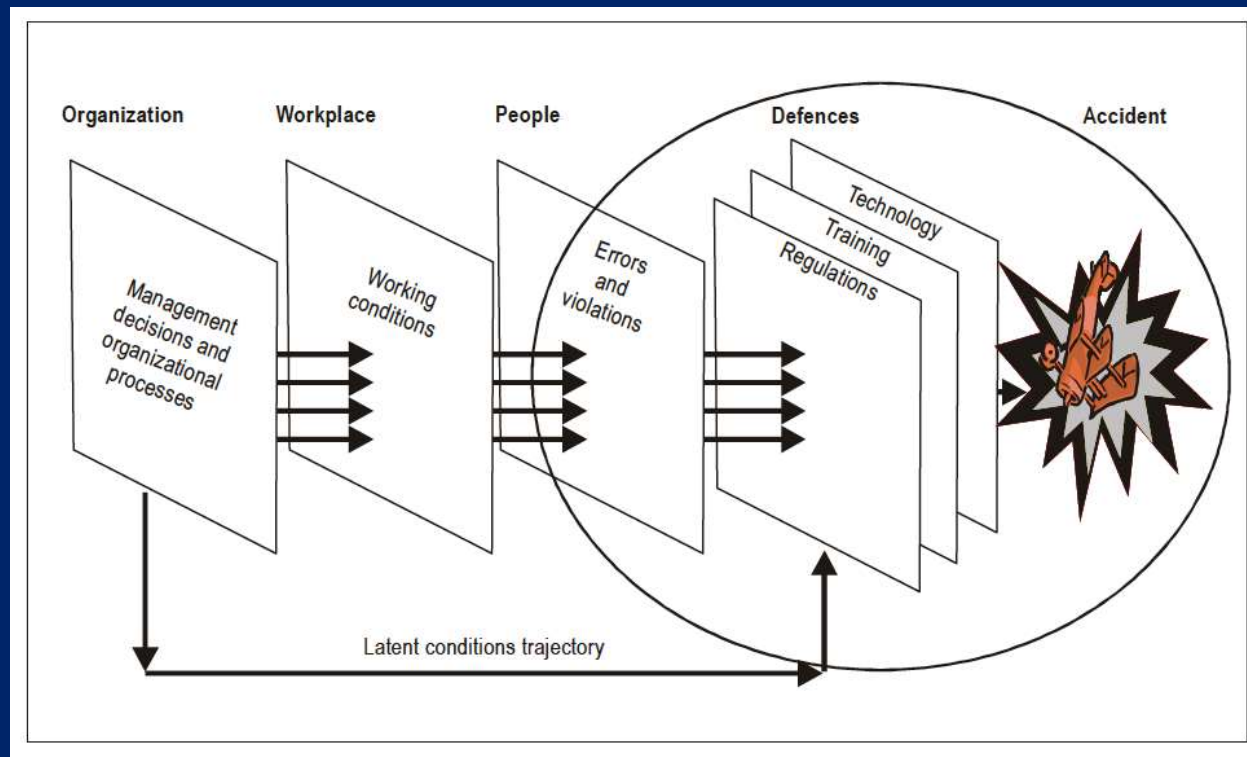


'Hide and Seek'

Operators hide Investigators seek



The Operator's challenges

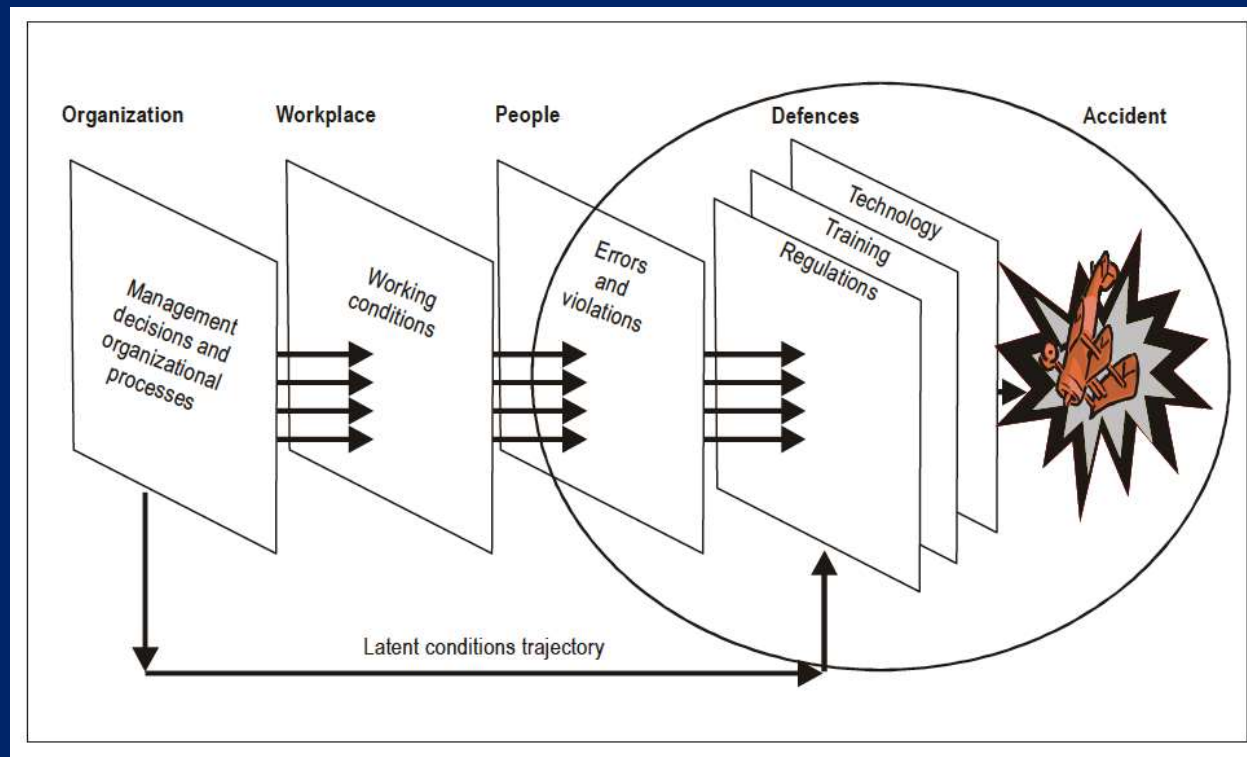


James Reason's Model

Hide

- LIVEWARE - Individual and Team Related aspects
 - Human Performance
 - Stress / Fatigue
 - Visual Perception
 - Memory
 - Attention and Vigilance
 - Communication / Leadership / Teamwork
 - Decision Making
- SOFTWARE / HARDWARE - Cognitive Aspects
 - Human-Machine Interface (HMI)
 - Automation Management
- ENVIRONMENT - Working Conditions and their Constraints
 - Environmental aspects and Ergonomics
 - Practical Drift

The Investigator's challenges



James Reason's Model

Investigator's Challenges - to Seek

- LIVEWARE - Individual and Team Related aspects
 - Human Performance
 - Stress / Fatigue
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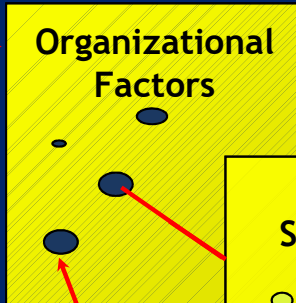
Looking for answers !

Inputs

- ◆ Economic inflation
- ◆ Few qualified pilots



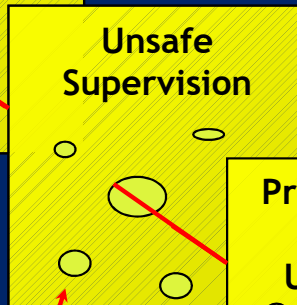
Organizational Factors



Latent Conditions

- ◆ Excessive cost cutting
- ◆ Inadequate promotion policies

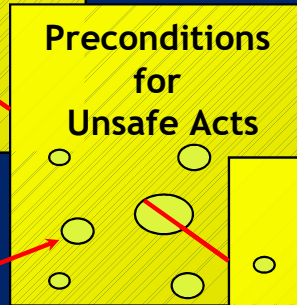
Unsafe Supervision



Latent Conditions

- ◆ Deficient training program
- ◆ Improper crew pairing

Preconditions for Unsafe Acts

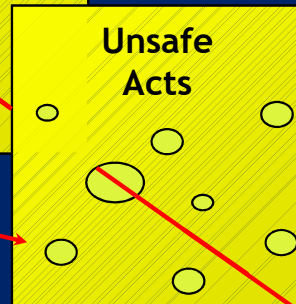


Active and Latent Conditions

- ◆ Poor CRM
- ◆ Loss of situational awareness

Failed or Absent Defences

Unsafe Acts

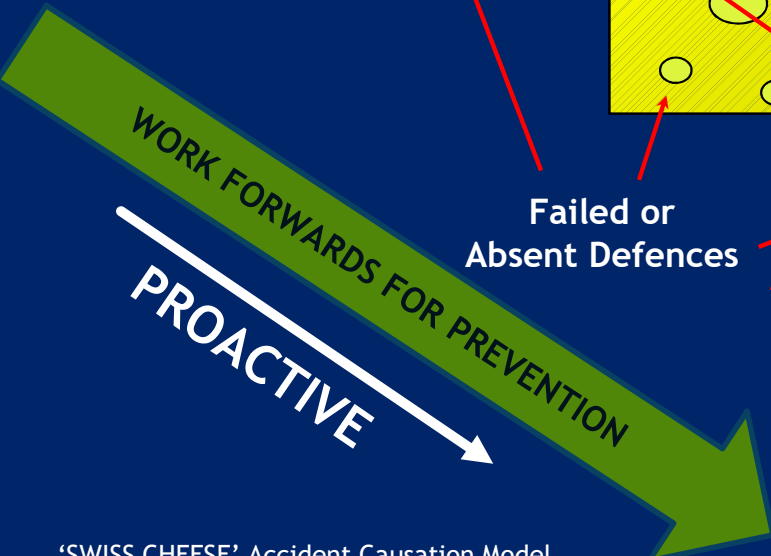
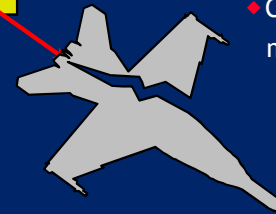


Active Conditions

- ◆ Failed to scan instruments
- ◆ Penetrated IMC when VFR only

Accident & Injury

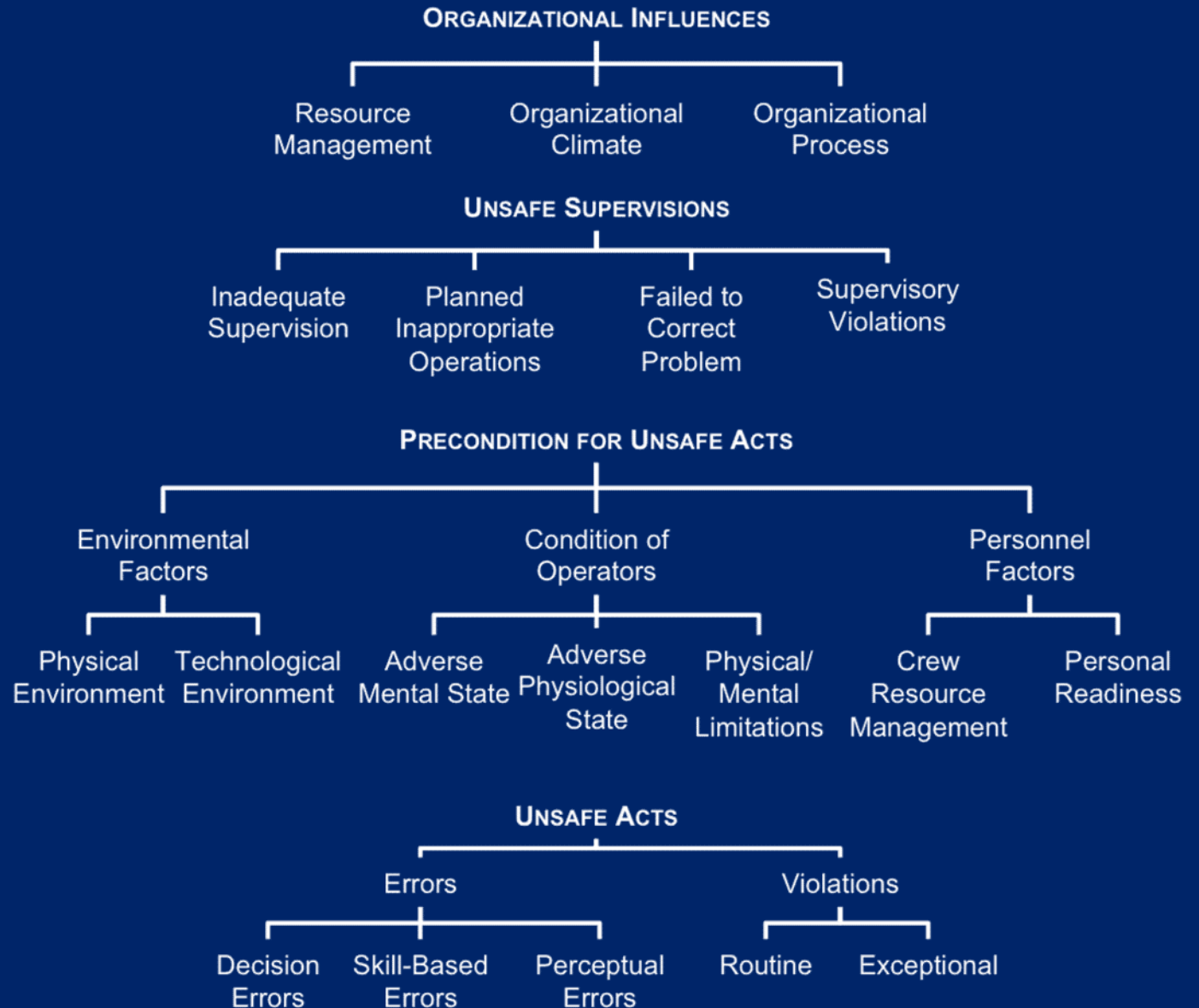
- ◆ Crashed into side of mountain



'SWISS CHEESE' Accident Causation Model

Adapted from Reason (1990)

Using HFACS - Human Factors Analysis and Classification System



The Game ends

when we find the answers in all the hidden places by knowing the enemy

Thank You