

# TRAINING FOR PROTECTION OF HUMAN PERFORMANCE AND LIMITATIONS IN AVIATION

**A CHALLENGE FOR DEVELOPERS**

# CRM and TEM

What's CRM??????

WHERE DID LOFT GO?

WHAT IS LOFT YOU ASK?

**CRM IMPROVED...**  
**COMMUNICATON**  
**SITUATIONAL AWARENESS**  
TEAM MANAGEMENT  
PROBLEM SOLVING  
ASSERTION

# OLOC (like gloc, only worse)

**O**VERLOAD **L**OSS **O**F **C**OGNITION.

Caused by the **rapid** or **gradual** onset of sensory information overloading the brain processing capacity.

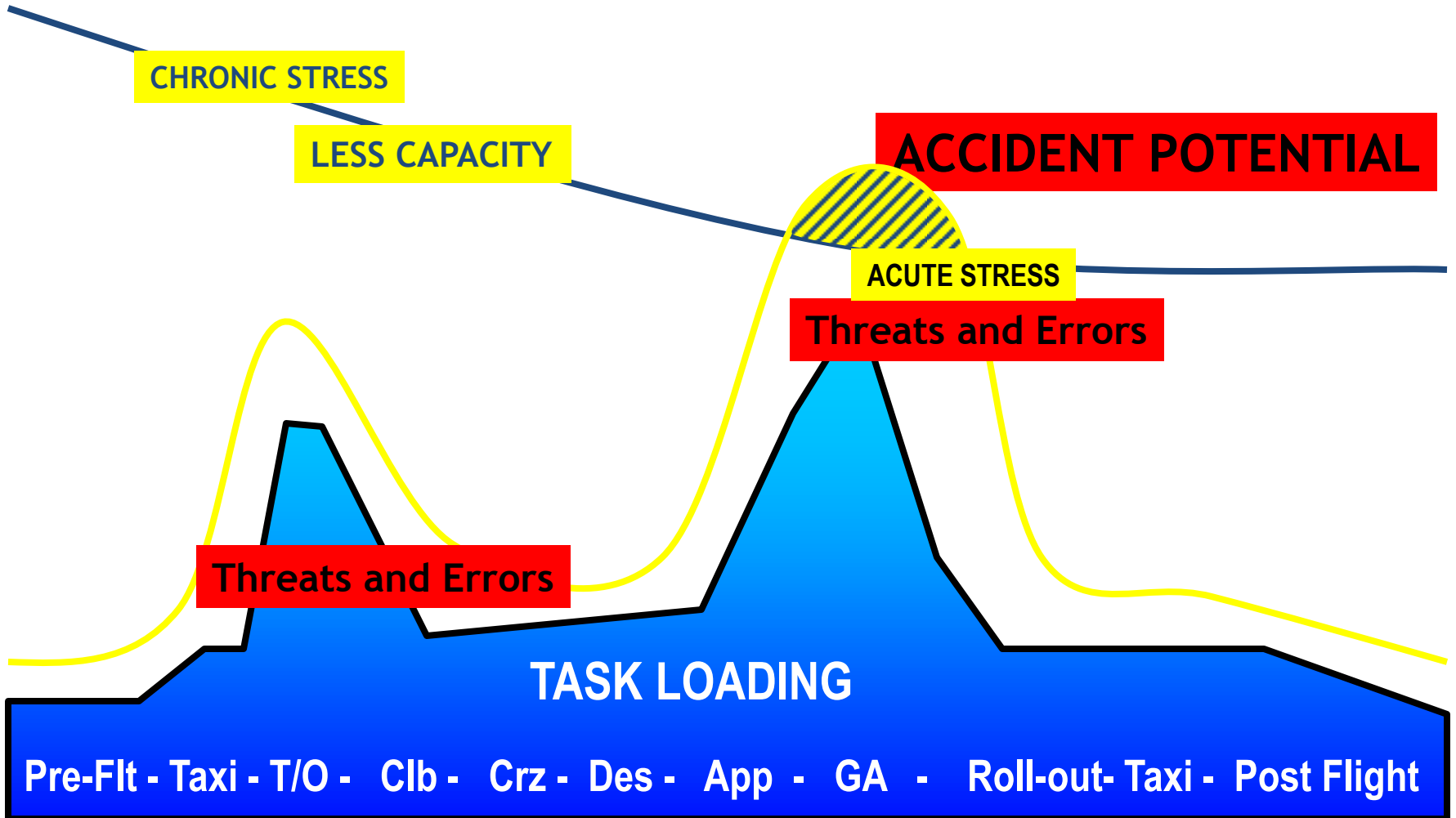
Manifested by a massive shut down... or a gradual degradation in processing ability

# TRAINING

## not checking

Training for OLOC improves performance through anticipation of threats and risk and the deliberate and planned protection of mental capacity

# Overload







# “BEANCOUNTER STEALS TRAINING FUNDS”

Some of the money ‘saved’ by chopping CRM LOFT and TRAINING (note outdated equipment)



# Dr. Rob Lee

About 1995 or so, Rob used an interesting analogy at one of his presentations. As a tribute to his foresight I use it again today...thanks Rob.

Photo taken circa: 1000AD



...and more recently!



# Aircraft Limits (ATC,Engineering etc)

- Through all our careers we are trained and checked on the limits of the equipment.
- Weight and Balance
- Take off data
- Temperatures and pressures
- Speeds
- Buffet boundaries
- SOP's
- Check lists

# POLICING THE LIMITS

- FOQA Flight Operational Quality Assurance and QAR Quick Access Recorder data monitors these limits continually.

# Simulator Checks

- The simulator is used to check the crew's ability to keep the aircraft within operational limits and standards (SOP's)
- Pass or Fail



# FOQA ANALYSIS-solution

- Generally creates more hard limits and rules to fix the violations and busts that may have been caused by overload.

# WHO OWNS THE PROBLEM

- Very few operators and managers accept responsibility for the performance busts detected by FOQA
- Some operators react badly to LOSA reports detecting high error rates
- LOSA does not currently or accurately reflect Human Performance and Limitations of the mission.

# INCIDENT AND SELF REPORTING

- Pilots and safety critical personnel are reluctant to self report, especially if it involves a performance lapse of their own.

Why not?

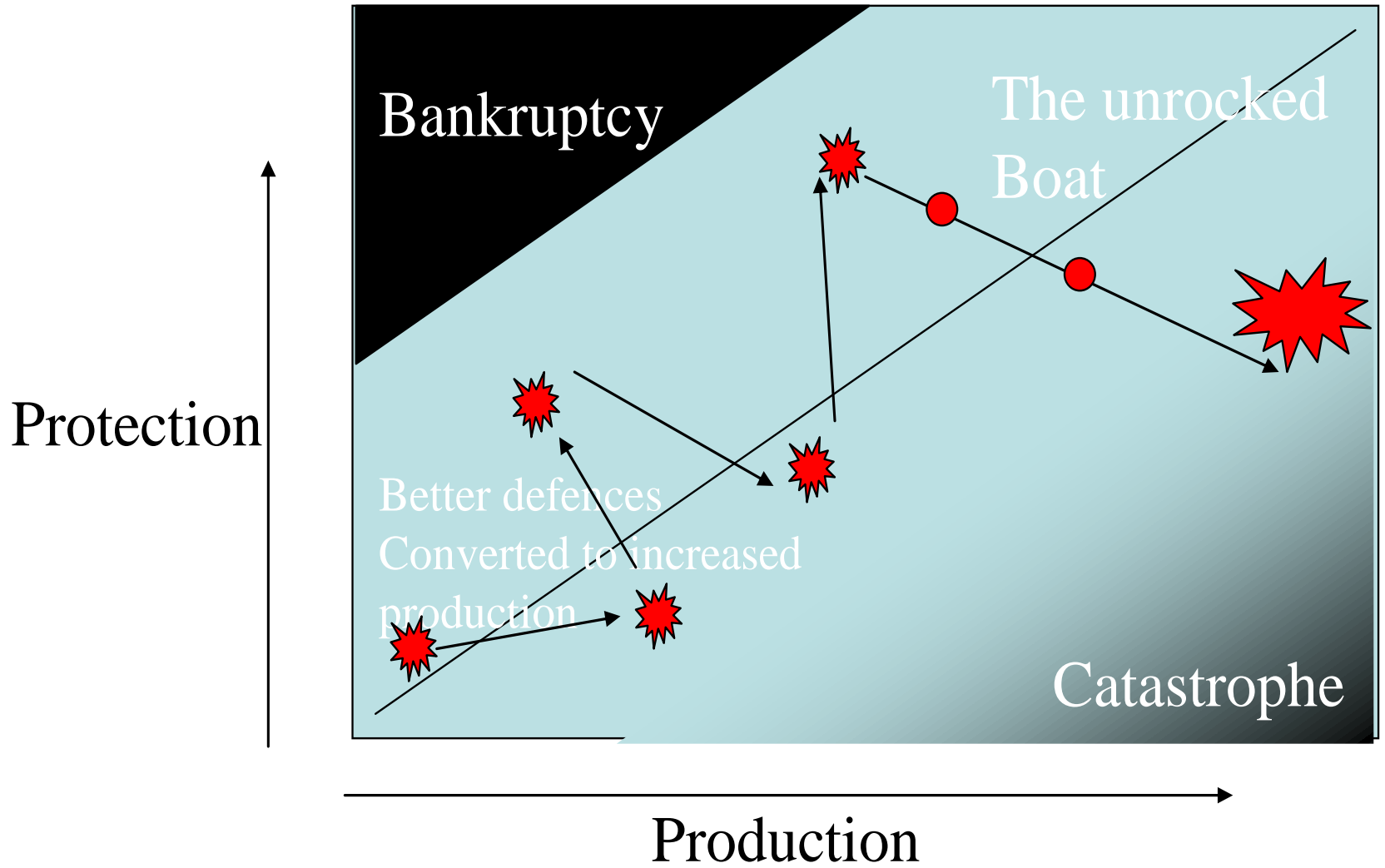
**BECAUSE:**

They do not trust the 'almost no blame' or the 'nearly just culture' in the the organisation.

How many senior managers here  
today?

- Do you think that Training Managers get what they want and need to improve training?

- BEAN COUNTERS CONTROL SAFETY...TRUE OR FALSE?



FOQA data is used to monitor aircraft performance limits and

**NOT**

**Human Performance Limits**



# COINCIDENCE?

- FOQA events, incidents and crashes *and* Human Performance and Limitations duress are **SYNCHRONOUS**.

- They occur together, or, as one occurs, the other follows.

- The “SYSTEM” denies the fact that a well trained Pilot/Engineer/CA/ATC or any other, has HUMAN LIMITATIONS OF PERFORMANCE that vary from person to person and day to day.

- In response to pilot complaints regarding fatigue in an Australian Airline, a manager sent out the following response. Without the picture of course

Toughen up  
Princesses!!!



- In Aviation and many other industries. Human Performance lapses that cause incidents or serious events(except medicine) are determined to be operator or pilot error.

- **PILOT ERROR CAN BE PUNISHED!**

- Apart from willful violations by crew and others, organisations must learn to accept responsibility for **all** system and human failures.



Managing Cognitive Overload can be assisted by using Threat and Error Management.

TEM comes in many flavours these days.

- Threat Management is PROACTIVE

- Error management is REACTIVE

- Threat + Opportunity = RISK

- RISK + NEGATIVE HF = UNDESIRE STATE  
(undesired operational state)  
Either aircraft or cognitive...usually both.

UNDESIREO STATE + OLOC = END STATE



THREAT



HF PROTECT

OK





THREAT



OPPORTUNITY



HF PROTECT

OK



RISK



PM



HF PROTECT

OK







THREAT



OPPORTUNITY



RISK



HF ERROR



HF PROTECT



PM



HF PROTECT



PM



HF PROTECT

OK

OK

OK





THREAT



OPPORTUNITY



RISK



HF ERROR



HF NEGLECT



HF PROTECT

OK



PM

HF PROTECT

OK



PM

HF PROTECT

OK

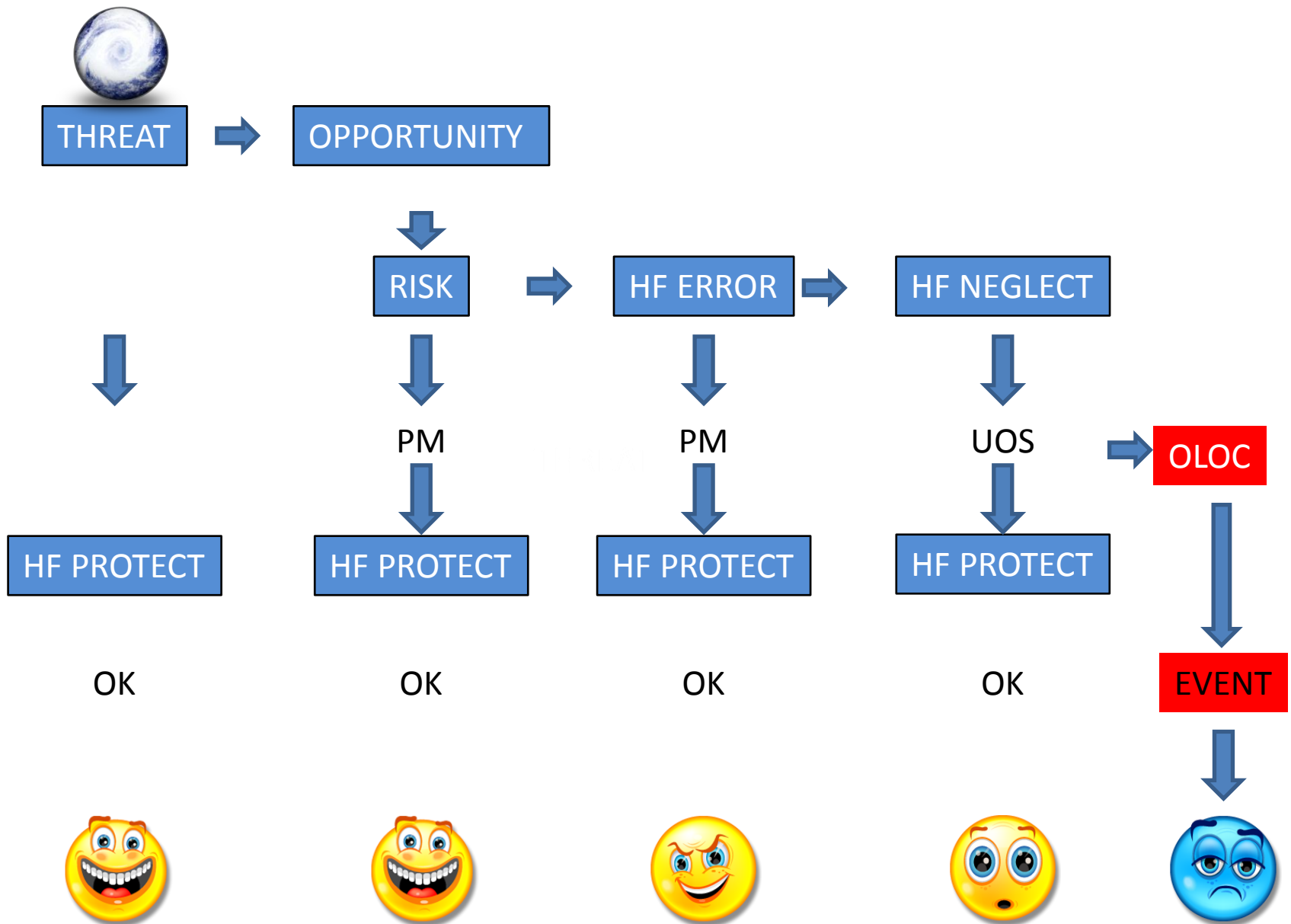


UOS

HF PROTECT

OK







- RAPID ONSET OF OVERLOAD CAN CAUSE THE PRIMITIVE BRAIN REACTION OF FIGHT OR FLIGHT, OLOC AND SHUT DOWN.
- .

- GRADUAL ONSET CAUSES DECAY AND POSSIBLE OLOC. THIS CAN BE OBSERVED BY OTHERS...PM FOR INSTANCE

- THE BANDWIDTH OF THE BRAIN IS INSUFFICIENT TO COPE WITH TOTAL INPUT OF ALL SENSORY INFORMATION AT ONCE.
- HENCE FILTERING, QUEING, AND OVERLOAD

# HOW DO WE TRAIN TO PREVENT OVERLOAD

- The industry (operators and regulators) have to accept that Human Limitations and Human Factors effect performance and are causal factors in almost all incidents and crashes.
- Research organisations need funding to research and develop facts relating to human cognitive function management.
- Airlines and other related sectors have to resource simulator type training to allow individuals to be exposed to their limits and to develop strategies to recognise those situations that will create overload.
- Cockpit Resource Management...Managing resources in the cockpit! Remember?



# IN THE MEANTIME

Accept cognitive overload as a reality.

Analysing LOSA and FOQA data shows that omissions, errors, mistakes and violations are work load related.

Train Checkers and LOSA observers to monitor and record workload and performance in high work load.

- Was: PNF Pilot Not Flying
- Now: Pilot Monitoring
- Could be: Pilot Managing

- Unload the captain during periods requiring protection of spare mental capacity.

“If you have a dog, why bark yourself”?

Introduce or reintroduce real LOFT (line oriented/operational flight TRAINING) using novel scenarios to expose crew to their human limits. Using simulators for what they were designed for.

# Standard Crew Training

- Threat Forecasting before and during operations.
- Worse case scenario for the day or the moment. Discuss and analyze prior to departure.

# Take into consideration

- Circadian Rhythm
- Duty time
- Fatigue
- Personal stresses
- Aircraft status
- Weather
- Corporate pressure
- Personal performance...etc

# During Flight or Shift; unexpected Threat

- Choose and discuss worse case scenario/outcome. Include possible engine failure or lightning strike
- Discuss and rehearse in detail
- Set limits and do not accept any further risk.
- Allocate all task in advance





# Alice in Wonderland

- “it is a poor memory that only works backwards”

The Queen of Hearts to Alice.

- It is time to step into the looking glass and look out to see what is going on rather than looking at the reflection and admiring oneself.