

How pilots help doctors....



Nanni Allington

Or Back to the future ?...or Back to basics ?



**BACK
TO THE FUTURE II**

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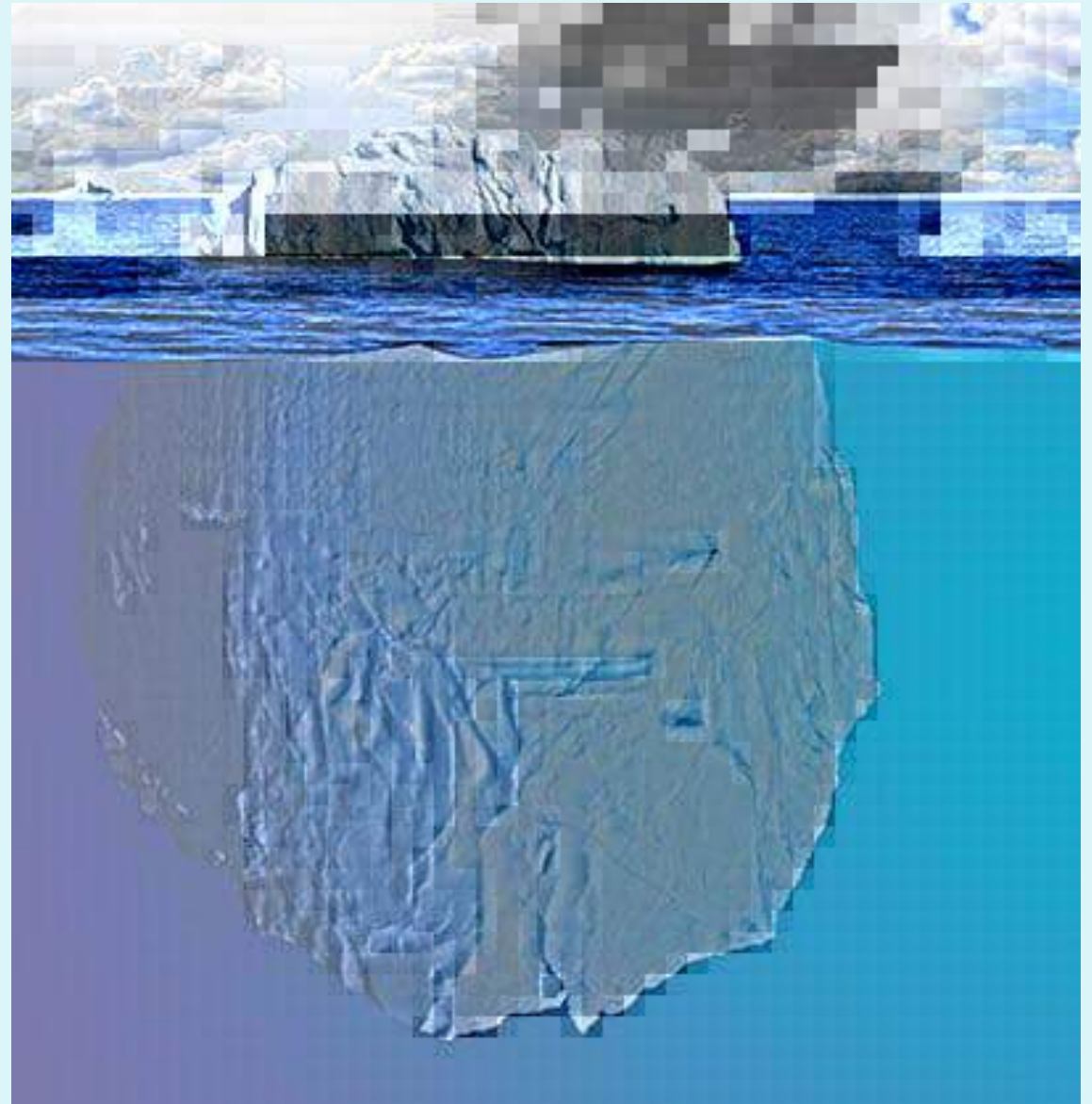
Nanni Allington

Or Back to the future ?...or Back to basics ?



- Teacher ?
- Man- Machine
- Artificial intelligence
- Challenges

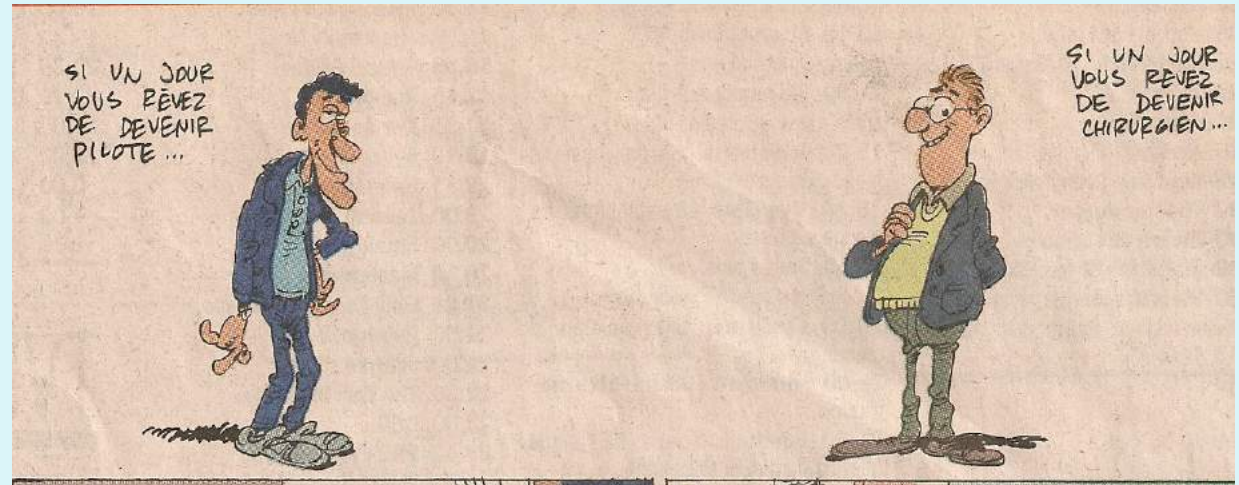
- Decision Making
- Risk assesement
- SMS
- Safety Culture
- Checklist.....



Nanni Allington

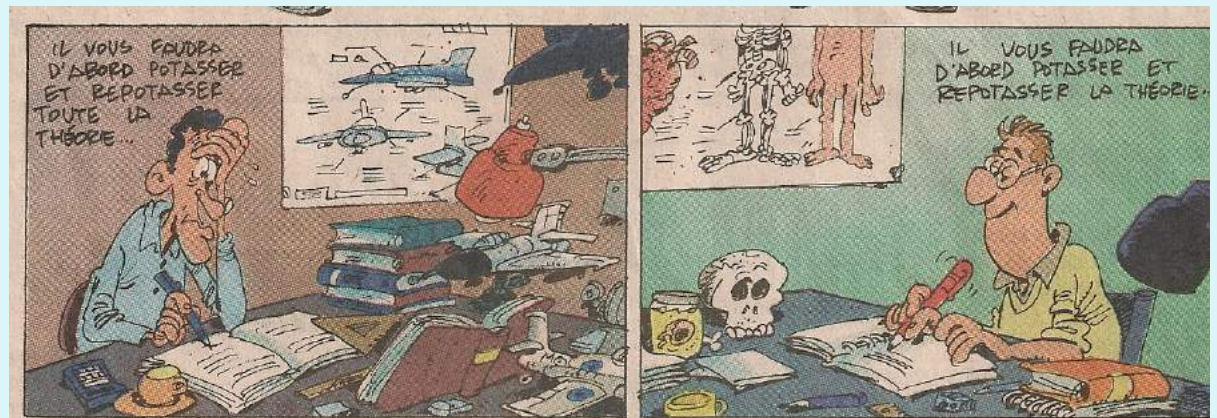
Learning...Teaching

- Change in behavior as a results of experience



- Behavior
- Cognitive

- Physical
- Intellectual



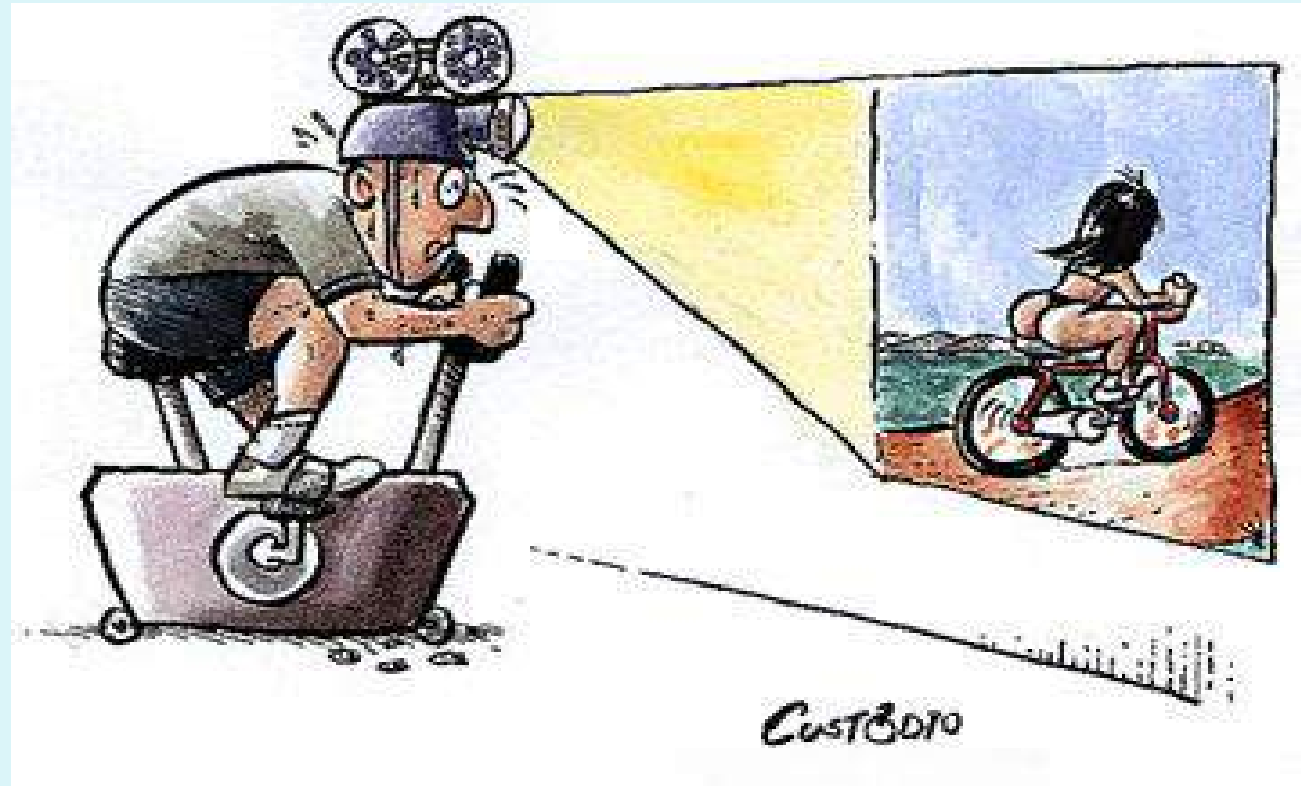
Learning

- Purposeful
- Experience
- Multifaceted
- Active



Factors involved

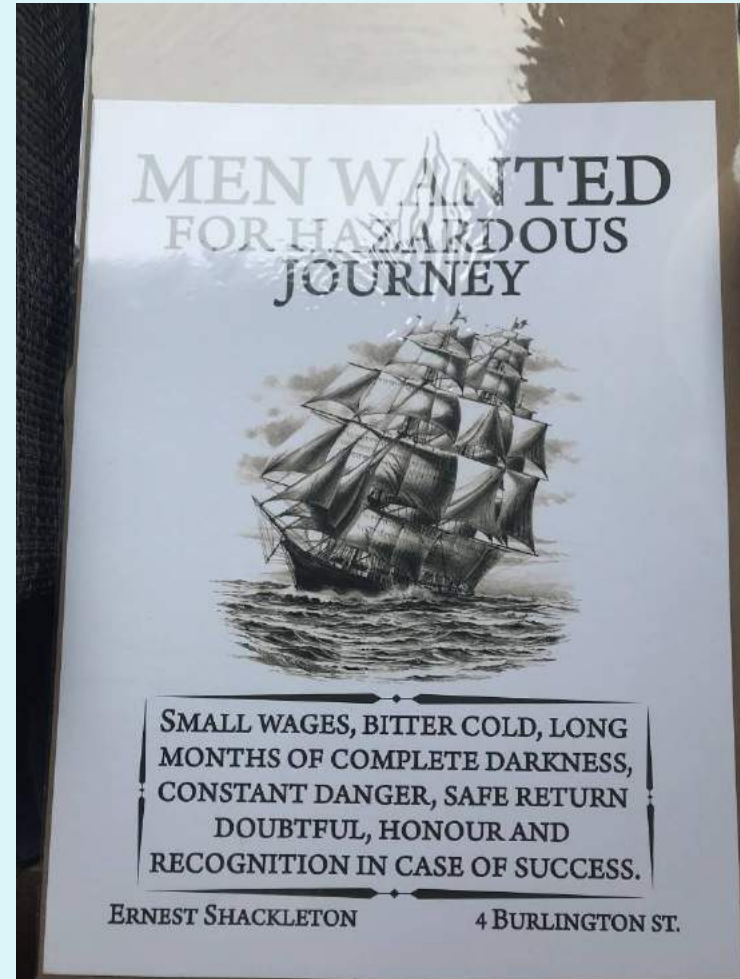
- Five senses
- Perception
- Threat
- Time
- Insight
- **Motivation**



Motivation.....1900

- Honor

- Glory



Motivation.....2020

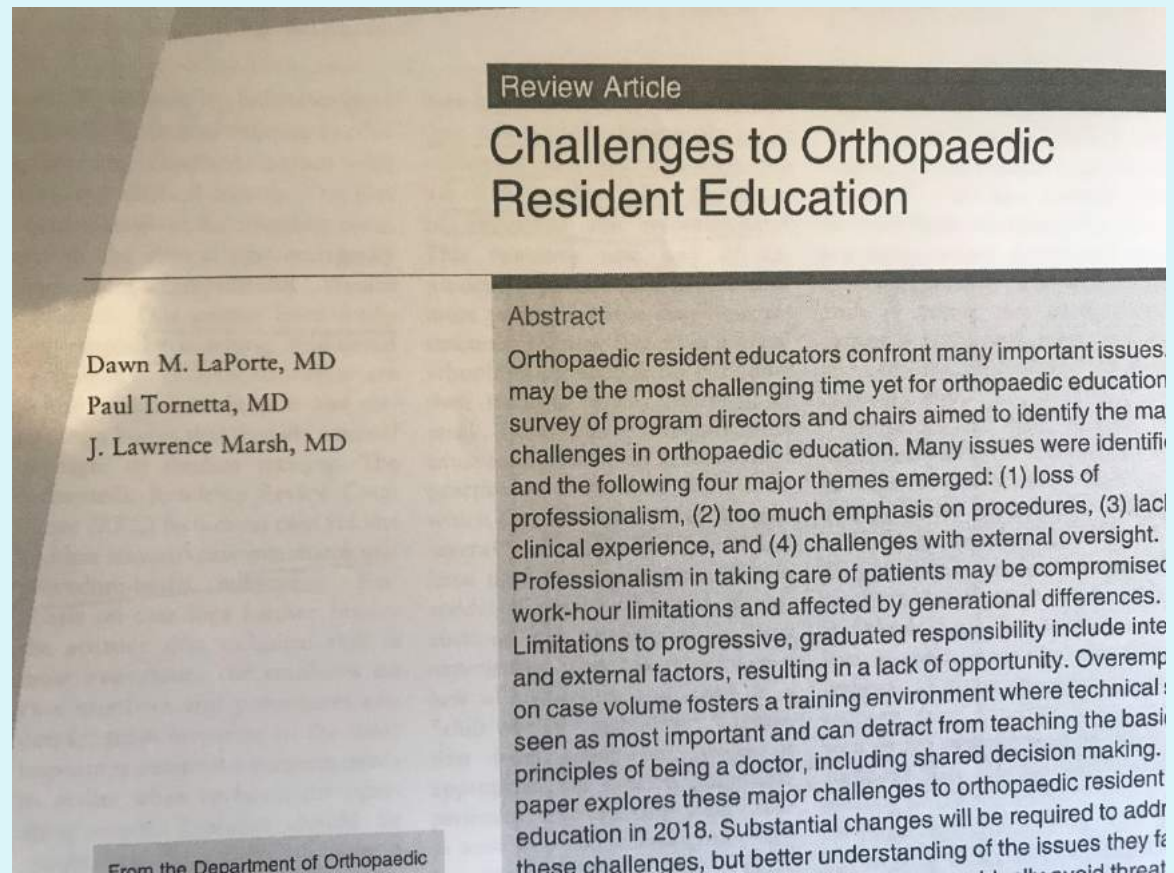
- <https://www.facebook.com/topitoparents/videos/259206898104348/>

Motivation.....2020...Challenges !

- The times there are changing.....Bob Dylan...
- Intelligence is based on how efficient a species became at doing things they need to survive
...Darwin
- It is not the strongest of the species that survive, nor the most intelligent, but the ones most responsive to change....Darwin

Challenges !

- American Academy of Orthopaedic surgeons. June 15, 2019, Vol 7, N 12
419-425



Learning Quality

- Intellect
- Communication
- Data
- Motivation
- Over learning...
decrease STRESS



- Retention of information

Factors involved

- Five senses
- Perception
- Threat
- Time
- Insight
- Motivation



Factors involved

- « Perceptions »
 - Physical
 - Basic needs
 - Goals and values
 - Self-concept
- Time
- Threat
- Motivation



Basic Needs

- Human needs



- Defense mechanism
- Effective teaching

Factors involved

- Senses
- « Perceptions »
- Time....
- Threat
- Insight
- Motivation



Factors involved

- Senses
- « Perceptions »
- Time
- Threat
- Motivation



Principles of Learning

- **Readiness**
- Exercise
- Effect
- Primacy
- Intensity
- Recency



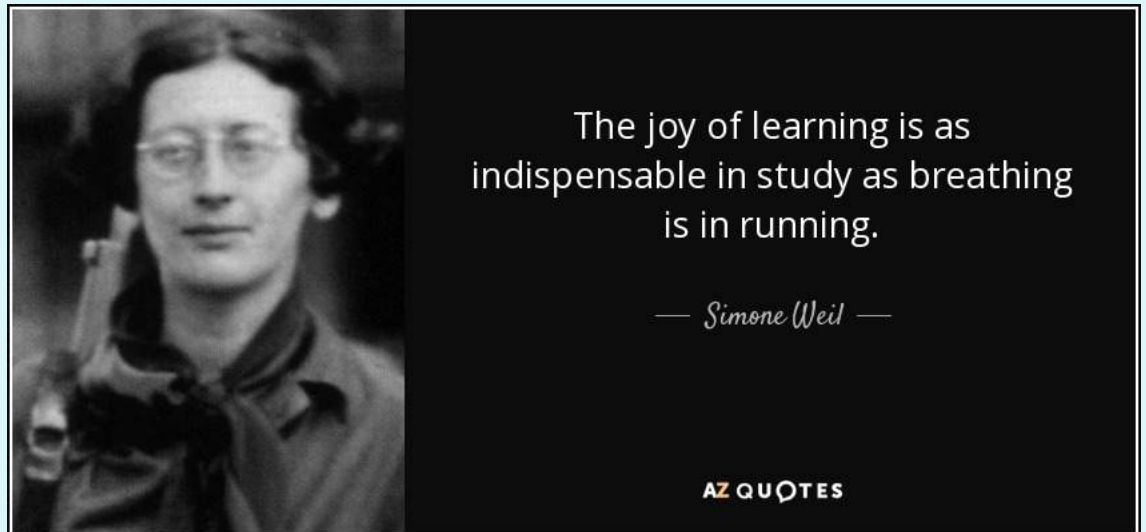
Principles of Learning

- Readiness
- Exercise...Experience... »I'll never do that again »...How to transfer ?
- Effect
- Primacy
- Intensity
- Recency



Principles of Learning

- Readiness
- Exercise
- Effect: it has to be pleasant
- Primacy
- Intensity
- Recency



Principles of Learning

- Readiness
- Exercise
- Effect
- Primacy
- Intensity
- Recency



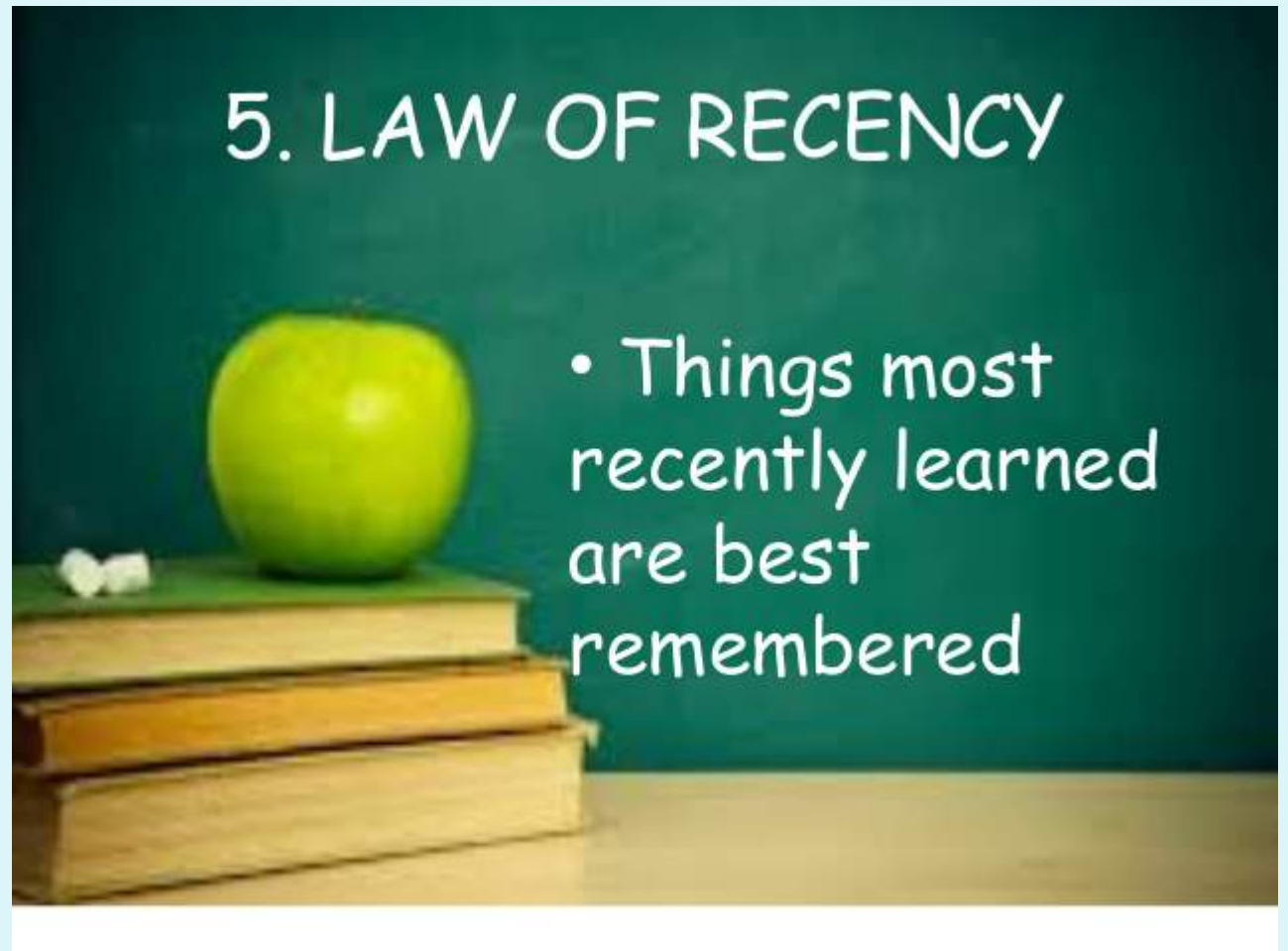
Principles of Learning

- Readiness
- Exercise
- Effect
- Primacy
- Intensity : some great moment, difficult surgery realized, a thank you !
- Recency



Principles of Learning

- Readiness
- Exercise
- Effect
- Primacy
- Intensity
- Recency



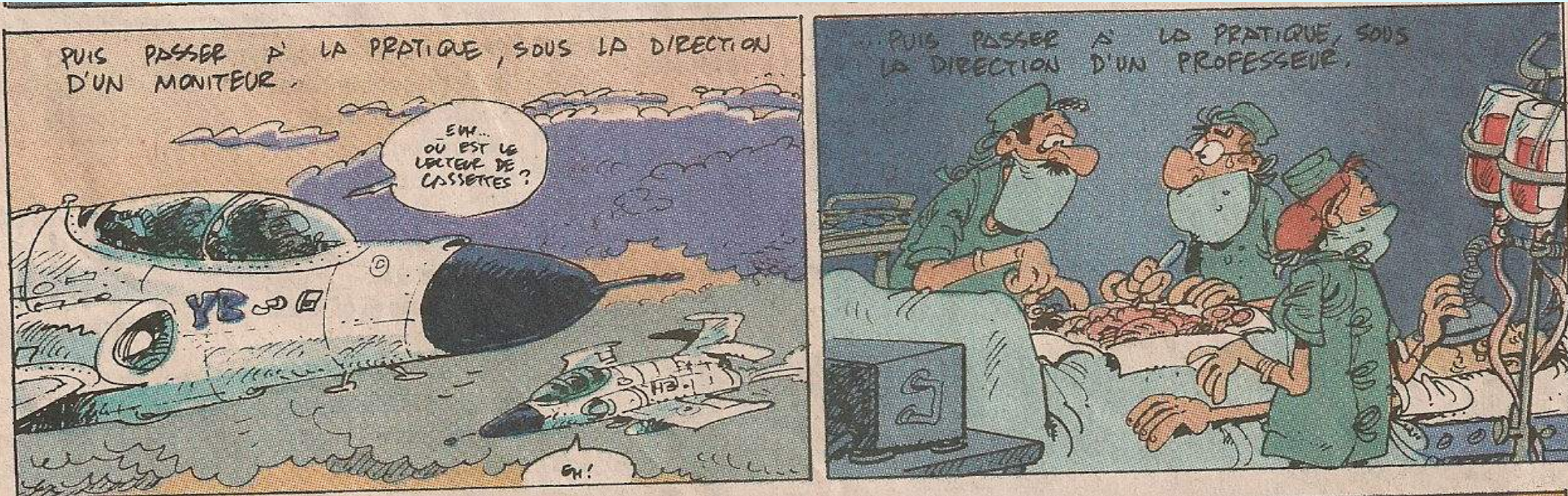
Learning

PUIS PASSER A LA PRATIQUE, SOUS LA DIRECTION
D'UN MONITEUR.

EH...
OU EST LE
LECTEUR DE
CASSETTES ?

EH!

PUIS PASSER A LA PRATIQUE, SOUS
LA DIRECTION D'UN PROFESSEUR.



Learning types

- Classical conditioning
Operant conditioning
Pavlov
Stall...XRay
- Cognitive-Insight : radio...
review procedure
- Imitation
- Experience
- Skill : imitation
and experience

ON



ON



ON



ON



Classical conditioning

- No central decision control
- Helios flight / Rio Flight
Contributing factor
- Routine error



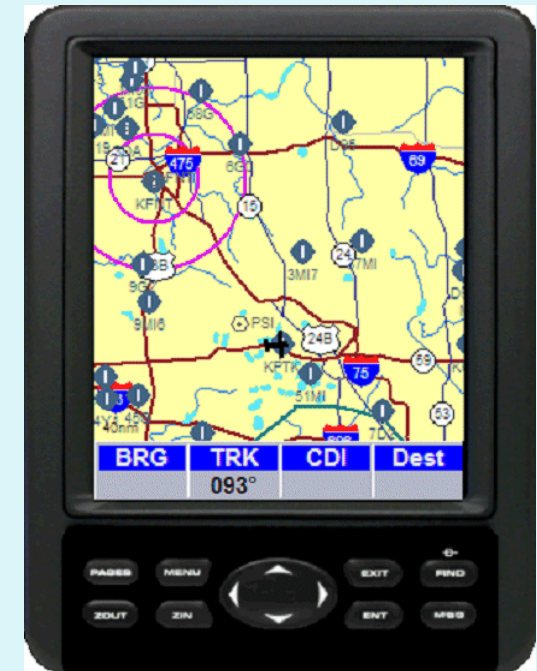
“Operant “ conditioning

- Voluntary behavior
- Learning to flare



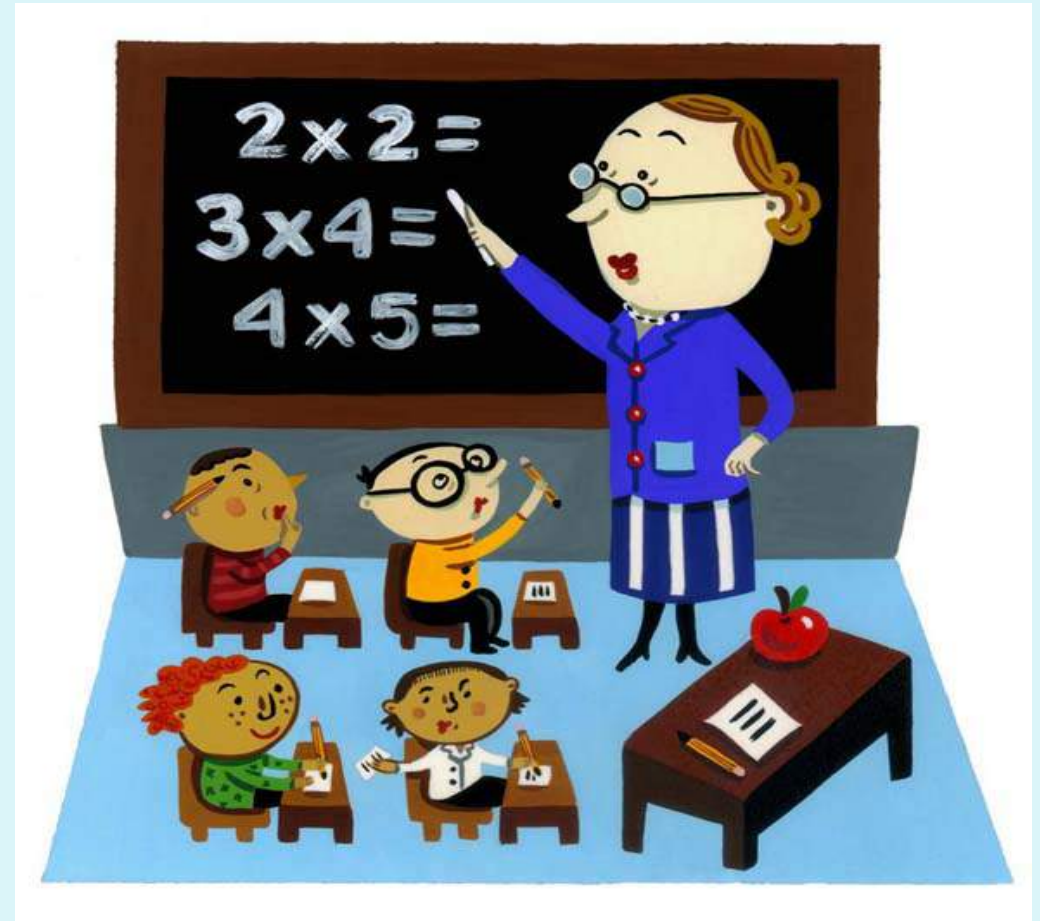
Cognitive learning

- Intellectual
- Retained
- Used
- Ex : Radio setup
- Associations of training
- Find solutions



Modelling = Imitation

- Observational learning
- Data from outside
- « instructor does...
- Your Behavior !!!!



Skill learning

- Experience : mistakes ! Trial and error
- Skill
 - Motivation
 - Attention
 - Observation
 - Practice
 - Feedback



Motor Program-Skills

- « Behavioural sub-routine »
- Walk, swim, fly...
- Social
- Linguistic
- Intellectual

- Long –term memory
- « procedural memory »



Motor Program-Skills

- Three Phases: Fitts and Posner 1960's
 - Cognitive
 - Associative
 - Autonomous

- Turn
Take-off
Steep turn...

- Fly and talk on radio



Transition

- Cognitive phase
Central decision max
No surplus
- Autonomous phase
Central free for other task
- No control of central decision system
- Stress ..lack of practice



Autonomous

- Practice- Practice
- Not everybody
- Emergency....back to associative or cognitive
- Stress ..lack of practice



Problems with skill execution

- Jean Rasmussen « SRK »
- « behaviors » or « action »
- Source of error

- Skill-based Behaviour
- Rules-based Behaviour
- Knowledge-based Behaviour



Skill Based Behaviour

- Motor Program

- Errors

 - Not novice

 - Experienced : tired
too relaxed

- Routine error

 - Action Slip : flaps instead of gear

 - Environmental capture



Rule based behavior

- « Procedure »
Crosscountry planning
Approach procedure
Emergency room procedures
for trauma care



- Long term memory : Procedure recall
- Short term memory : Situation update

Rule based behavior

- Emergency drill
- Immediate action
- Checklist

- Standard
- Robust
- Strong

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF ROLL

1. Power Lever -- BETA range.
2. Brakes -- APPLY.
3. Wing Flaps -- RETRACT.

If airplane cannot be stopped on remaining runway: *STEER !!*

4. Fuel Condition Lever -- CUTOFF.
5. Fuel Shutoff -- OFF (pull out).
6. Fuel Tank Selectors -- OFF (warning horn will sound).
7. Battery Switch -- OFF.

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed -- 85 KIAS with 20° flaps.
2. Propeller -- FEATHER.
3. Wing Flaps -- FULL DOWN.
4. Fuel Condition Lever -- CUTOFF.
5. Fuel Shutoff -- OFF (pull out).
6. Fuel Tank Selectors -- OFF (warning horn will sound).
7. Battery -- OFF.

STEER !!

ENGINE FAILURE DURING FLIGHT

1. Airspeed -- 95 KIAS.
2. Power Lever -- IDLE.
3. Propeller Control Lever -- FEATHER.
4. Fuel Condition Lever -- CUTOFF.
5. Wing Flaps -- UP.
6. Fuel Boost Switch -- OFF.
7. Fuel Shutoff -- OFF (pull out).
8. Ignition Switch -- NORM.
9. Standby Power Switch (if installed) -- OFF.
10. Electrical Load -- REDUCE.
11. Landing -- Refer to Emergency Landing Without Engine Power checklist.

→ Abort!
→ Communicate

ENGINE FLAMEOUT DURING FLIGHT

1. If Gas Generator Speed (Ng) Is Above 50%:
 - a. Power Lever -- IDLE.
 - b. Ignition Switch -- ON.
 - c. Power Lever -- AS DESIRED after satisfactory relight as evidenced by normal ITT and Ng.
 - d. Ignition Switch -- OFF if cause of flameout has been corrected.
2. If Gas Generator Speed (Ng) Is Below 50%:
 - a. Fuel Condition Lever -- CUTOFF.
 - b. Refer to Airstart checklists for engine restart.

Rule based behavior - Errors

- Error of commission
 - Misinterpretation
 - Wrong procedure
- Departure from rules



Knowledge based behavior

- « The unexpected »
No procedure
- Unskilled person
- Info
Knowledge
Experience
Find solution

- Long term memory
Mental models



Knowledge based behavior

Errors

- Individual
- Inaccurate – incomplete Mental model
- Over-confidence
- Lack situation awareness
- Confirmation bias
- Frequency bias
- Inference....hope



Knowledge based behavior

- Energy consuming
- Deal with non-routine unfamiliar situation

- Evaluate evidence
Get conclusion

Act



- Only reason to keep flying ...better than computers ?...or ?

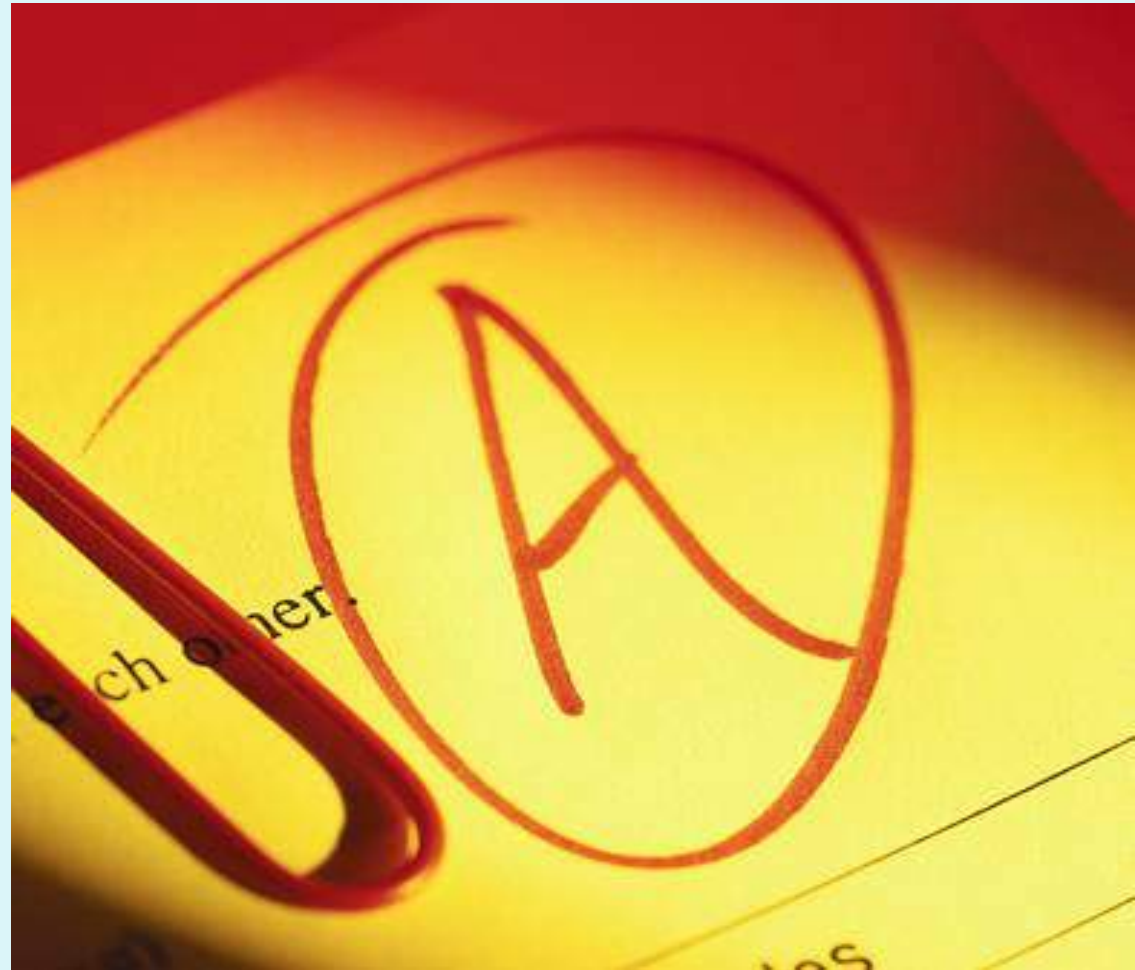
Learning a physical skill

- More than muscle
- Desire
- Patterns
- Perform the skill
- Knowledge of results



Learning a physical skill

- More than muscle
- Desire
- Patterns
- Perform the skill
- Knowledge of results



Learning a physical skill

- Duration of lesson
- Evaluation-critique
- Application of skill
- Memory
- Forgetting - Retention

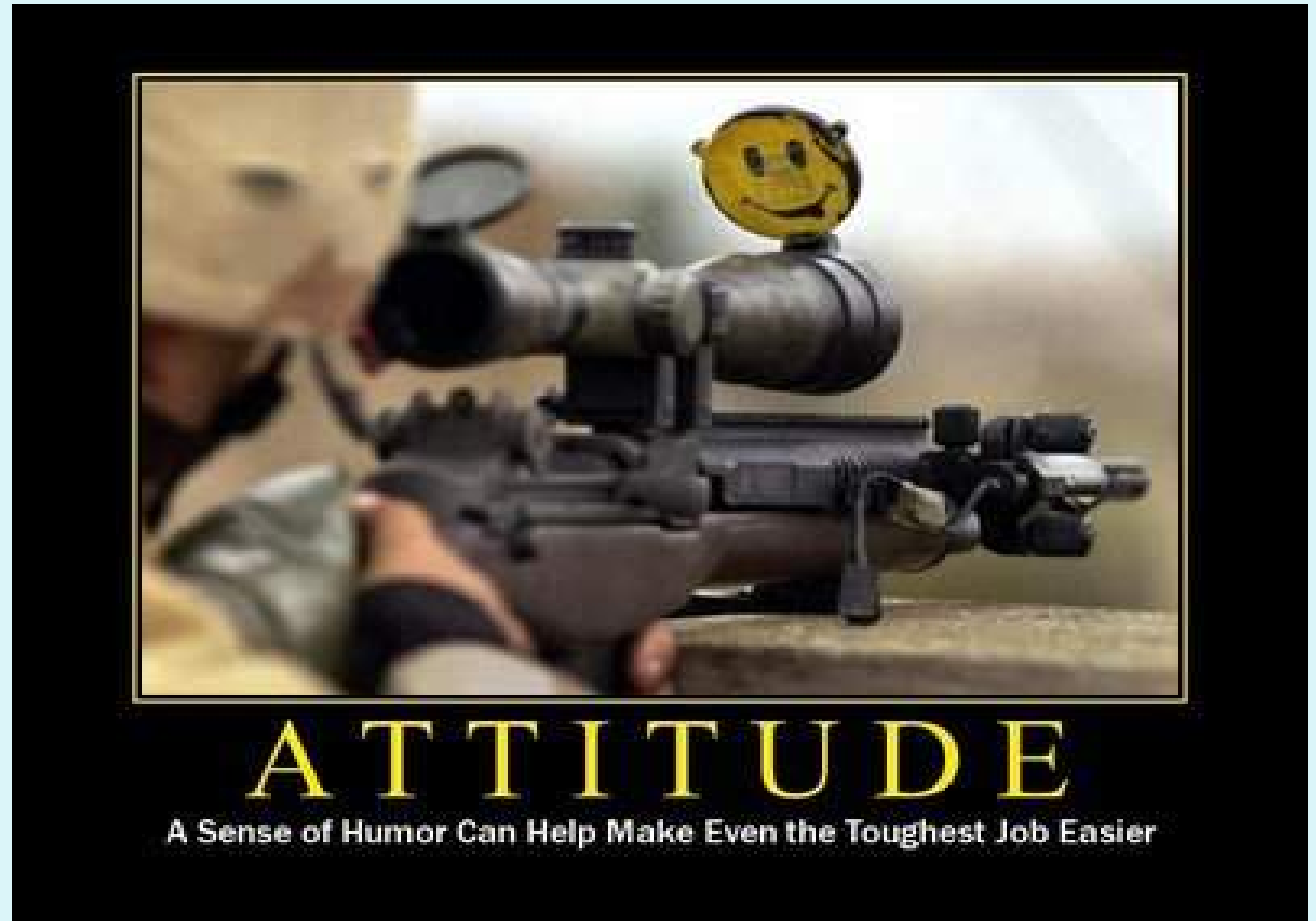
MY SOCIAL SKILLS INCLUDE:

- LAUGHING WHEN I SHOULDN'T LAUGH
- TELLING JOKES IN AWKWARD SITUATIONS
- SAYING "YOU TOO" WHEN MY SERVER TELLS ME TO ENJOY MY MEAL

MOMSGOTINK

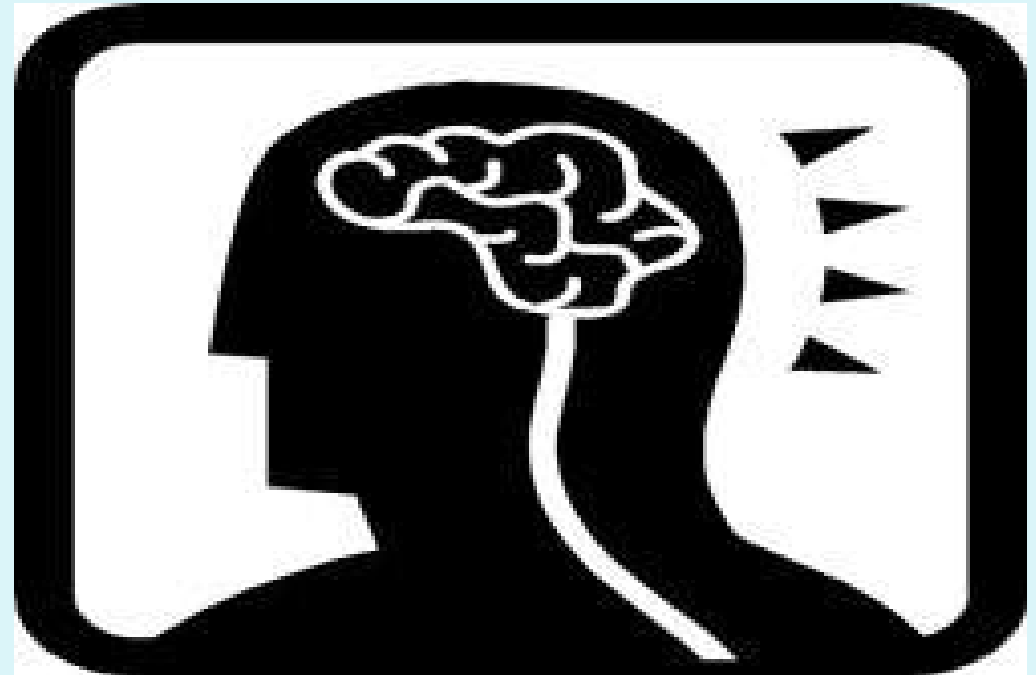
Retention of physical skill

- Praise
- Recall
- Attitude
- All senses
- Repetition



Human behavior

- Role .. You are the teacher...Authority
- Generalities
- Human needs
- Defense mechanism
- Effective teaching



Human behavior

- Role
- Generalities
 - Joy of learning
 - Responsability
- Human needs
- Defense mechanism
- Effective teaching



Human behavior

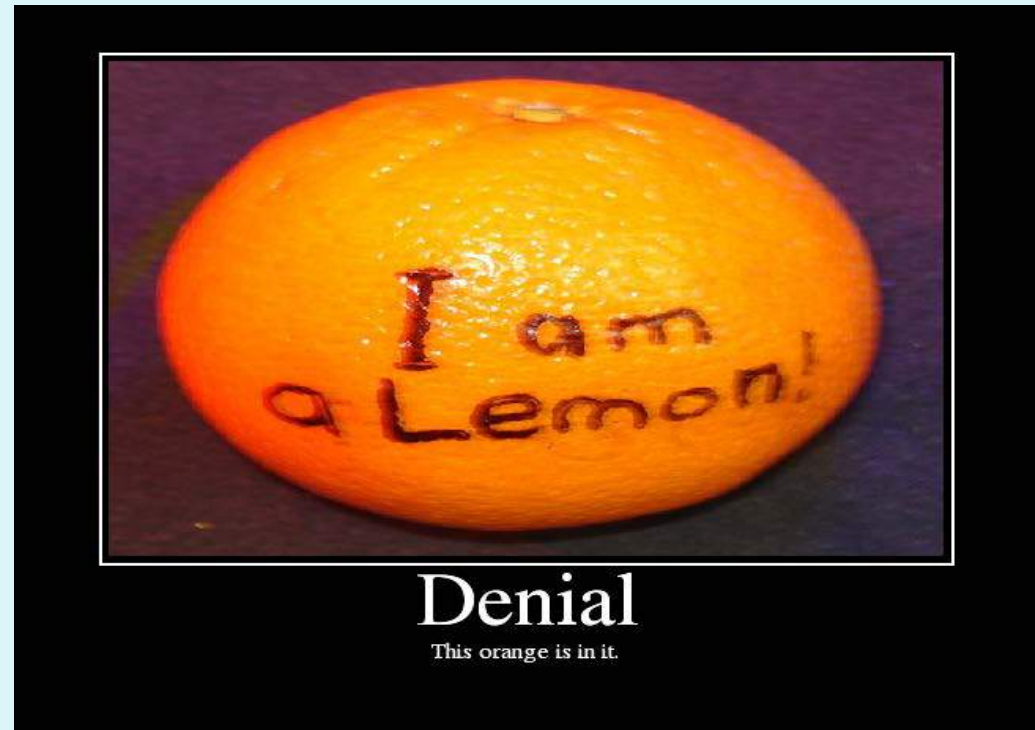
- Role
- Generalities
- Human needs
- Defense mechanism
- Effective teaching



Figure 2-2. Several common defense mechanisms may apply to aviation students.

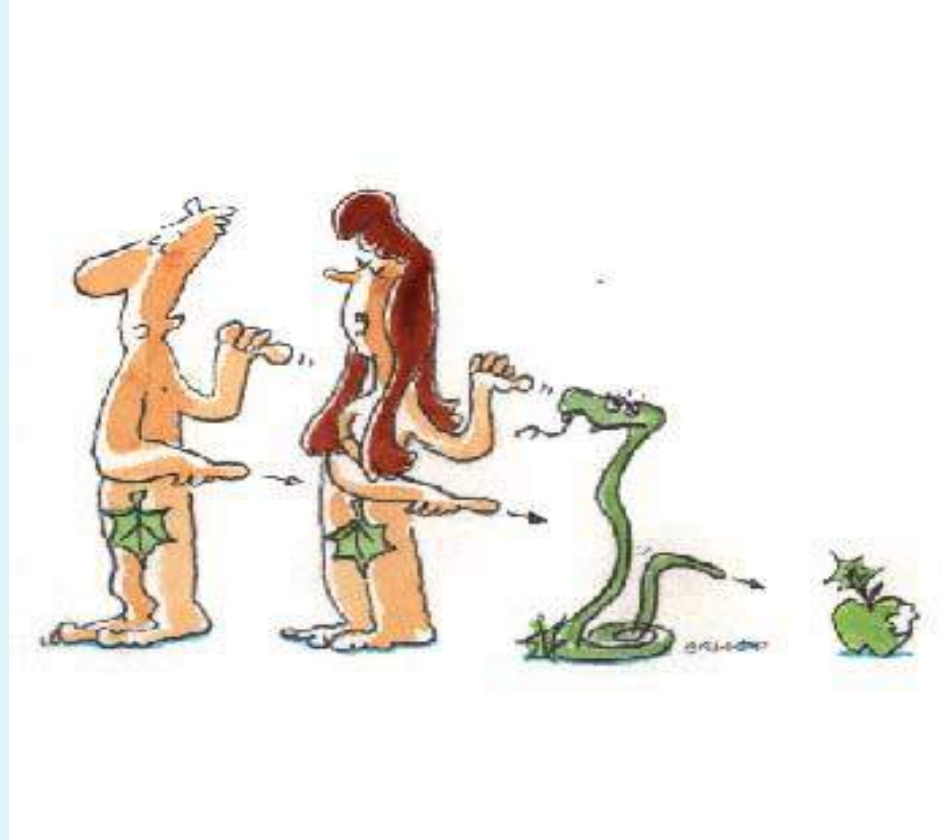
Defense Mechanisms..unconscious

- Denial
- Regression
- Rationalisation
- Compensation
- Projection
- « Flight »
- Aggression
- Resignation
- Reaction



Defense Mechanisms..unconscious

- Denial
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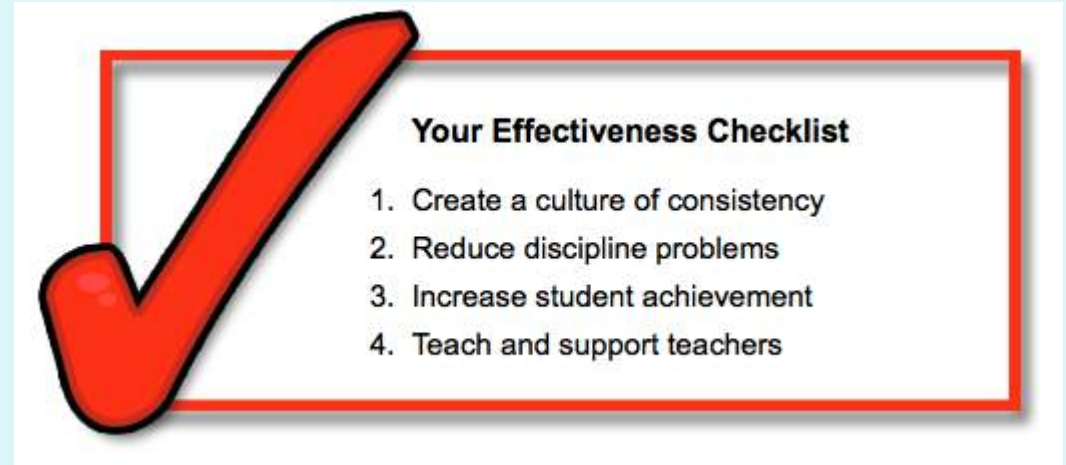
Defense Mechanisms..unconscious

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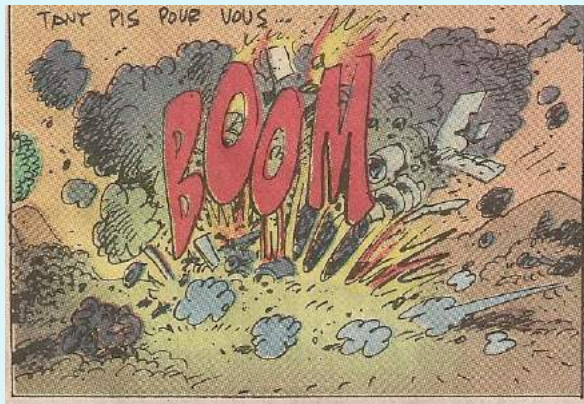


Human behavior

- Role
- Generalities
- Human needs
- Defense mechanisms



- Effective teaching : keep motivation, informed, individuals, constructive critic, be consistent, admit mistakes, praise...



Teaching the safety culture ...

- Whats is it ?
- Why . Why now ?



“Flight Safety” culture

- Airline company « motivation » : profit
- Passenger : get there on timewith luggage
- Pilot : job, status, fun.....
- Organisation !

Safetyprofit...balance



“Nuclear powerplant” Safety”

culture

- Electrical company
« motivation » : profit
- Citizen : cheap electricity..
- AFCN : Security !.
- Organisation !

Safetyprofit...balance



“Medicine Safety” culture

- Hospital company « motivation » :profit
- Patient : get good and safe care...
- Doctor : job, status,
.....
- Organisation !



Safetyprofit...balance

“Hospital” ...history

- Purely humanitarian.....
- Balanced finances
- Profit....



Safety Culture ?

Health and Security



Prevent Risks

Why ?

Price of insurances

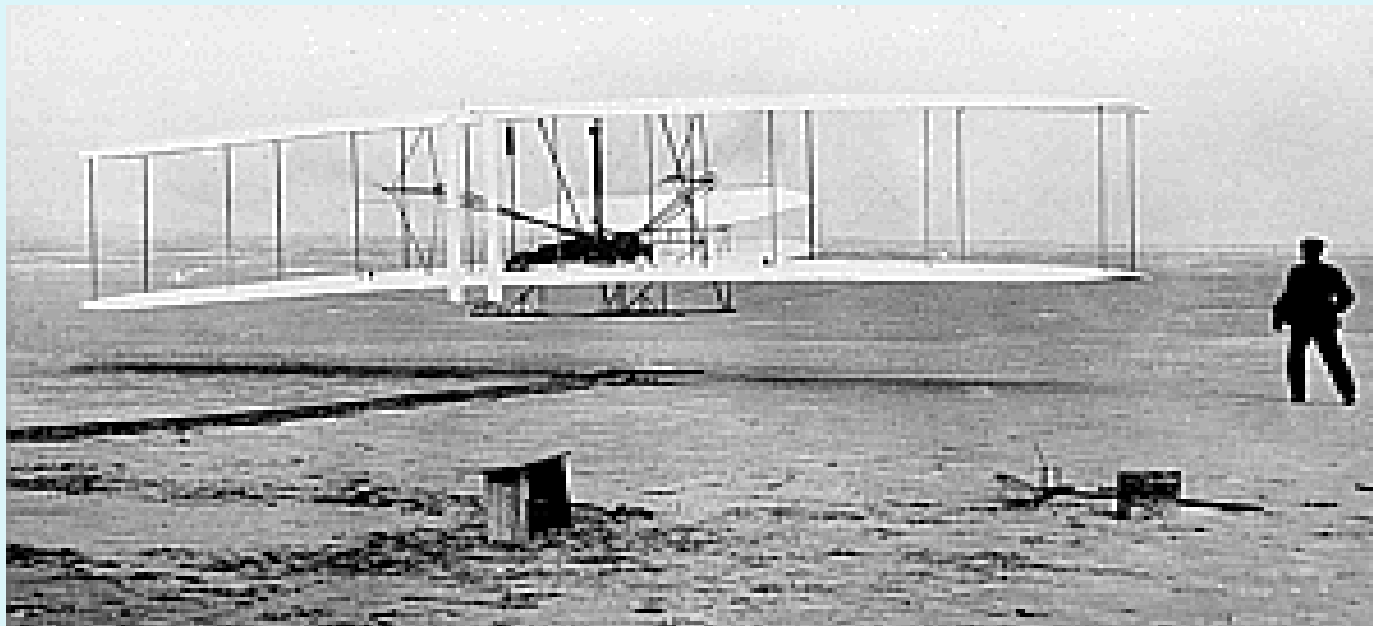
Public Image

Responsability



HISTORY

- Fitness
- Mechanics
- Instruments ? Checklists ?



HISTORY

- Technological development
- Human factor :
crew ,
ground crew ,
maintenance ,
ATC...



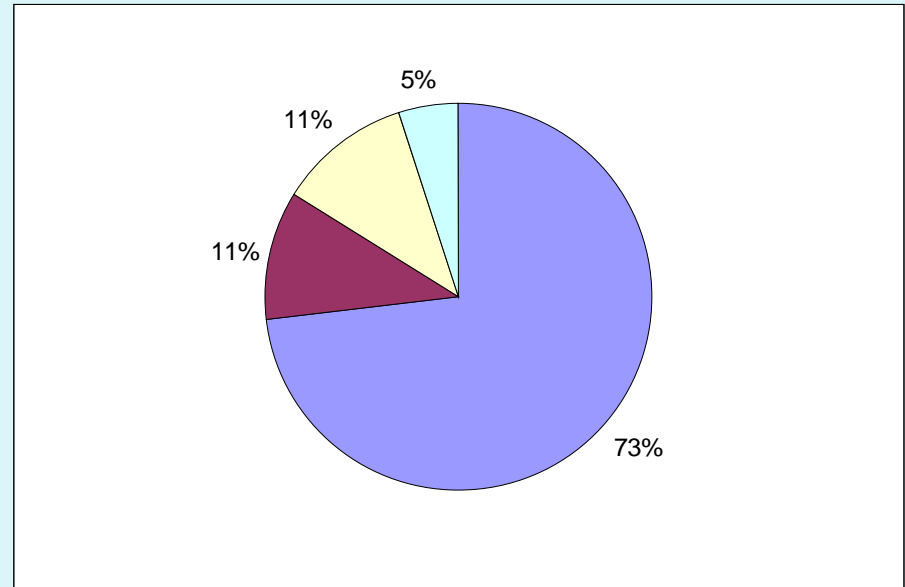
Safety Facts - Aircraft Accidents

- 73 % Pilot

WHY ?

- 11 % ATC
- 5 % Météo
- 11 % Mechanics

AND US ?

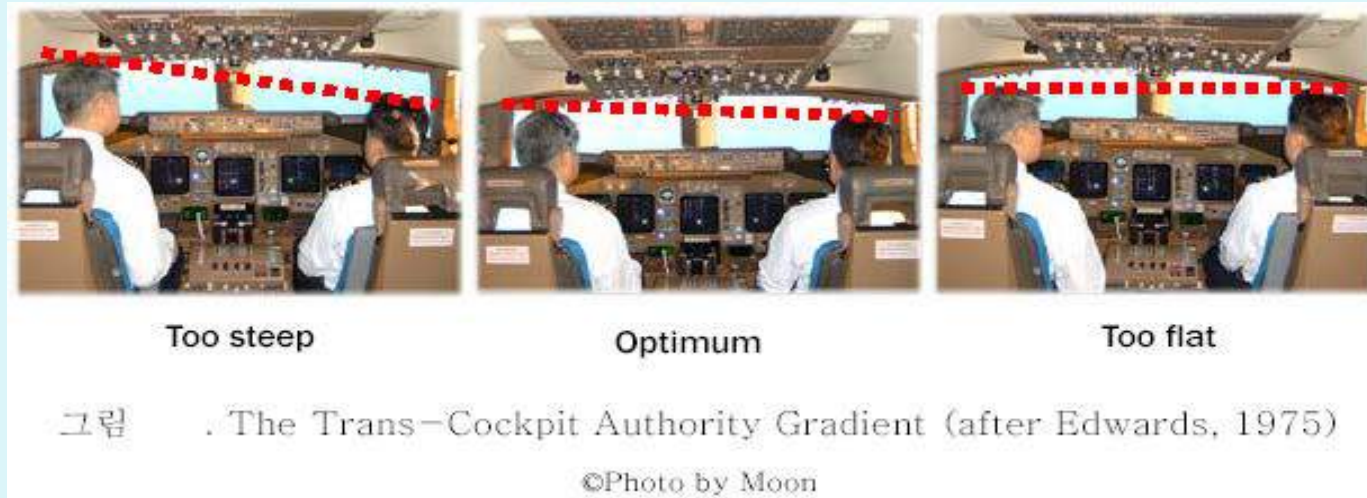


.....1972.....CRM



<http://www.youtube.com/watch?v=ICqPGkto3Yo>

The authority gradient



- The autocratic cockpit
- The laissez-faire
- The synergistic (the ideal)

CrewTeam

- Sharing tasks
- Avoid overload
- Teamwork
- Good atmosphere
- ...Medicine:
Multidisciplinary approach



There is no I in team

Human Error...Factor

- « pilot error »/ doctor error

- Why ?

- How ?

- What to do ?

- To err is

human.....Seneca



Human error – reliability

- 1/100

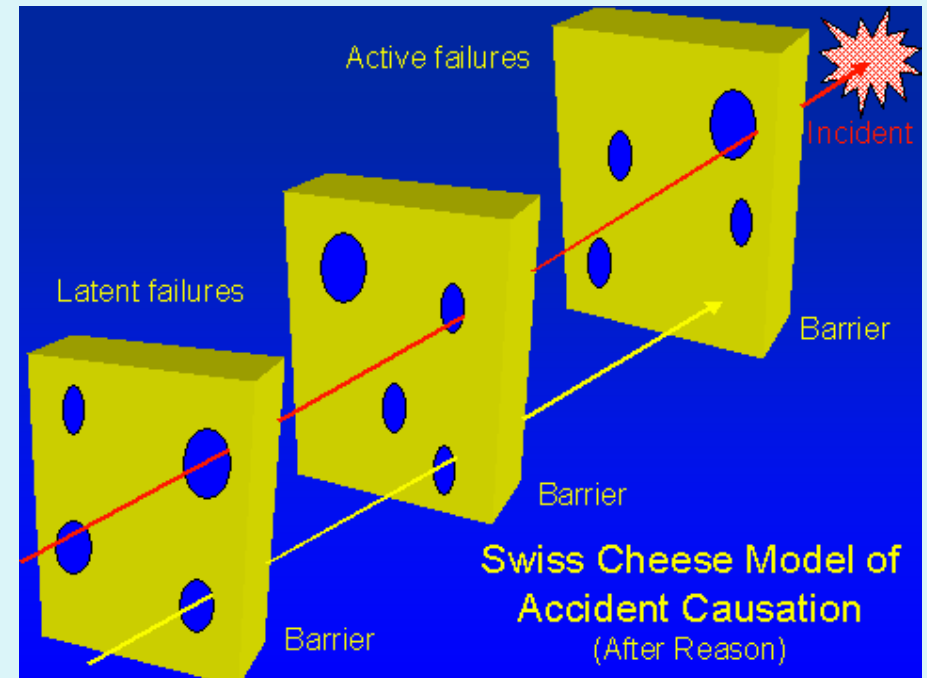
Overloaded, tired

Complacency, overconfidence

- 1/1000

Practice

- Chain reaction

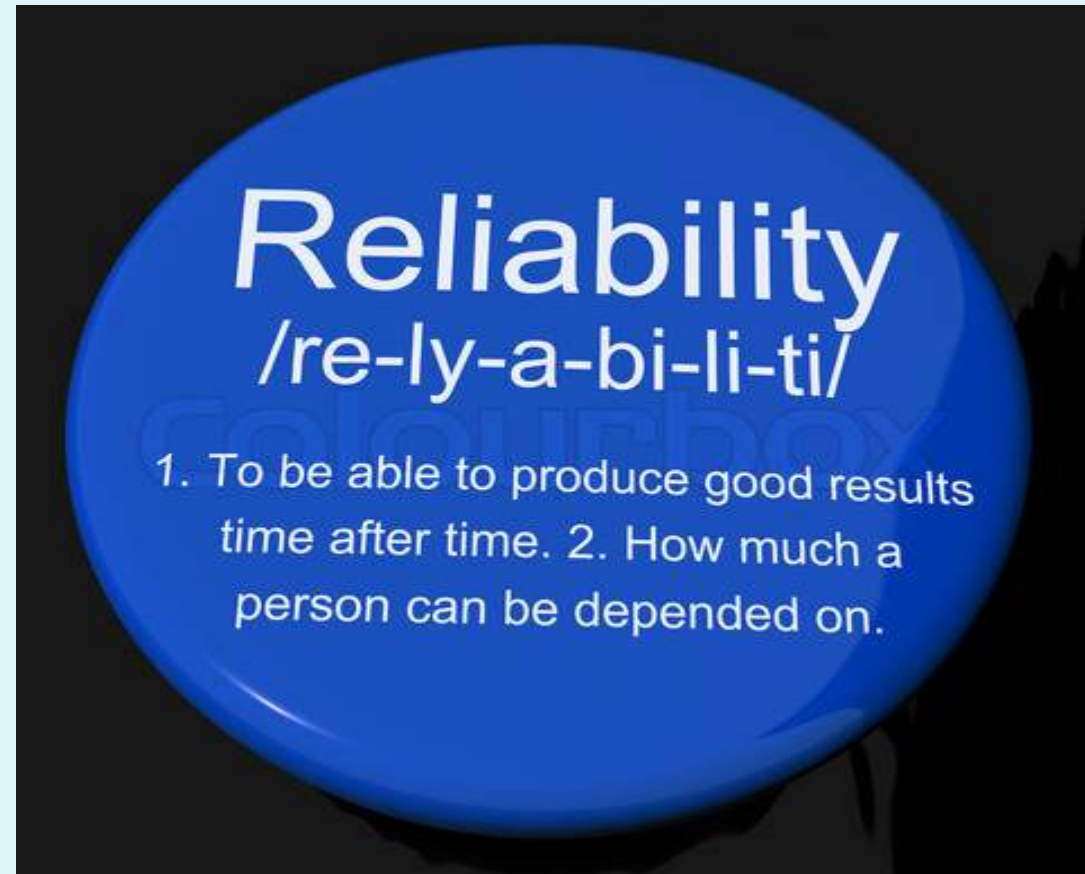


Human Reliability

- Rational decisions

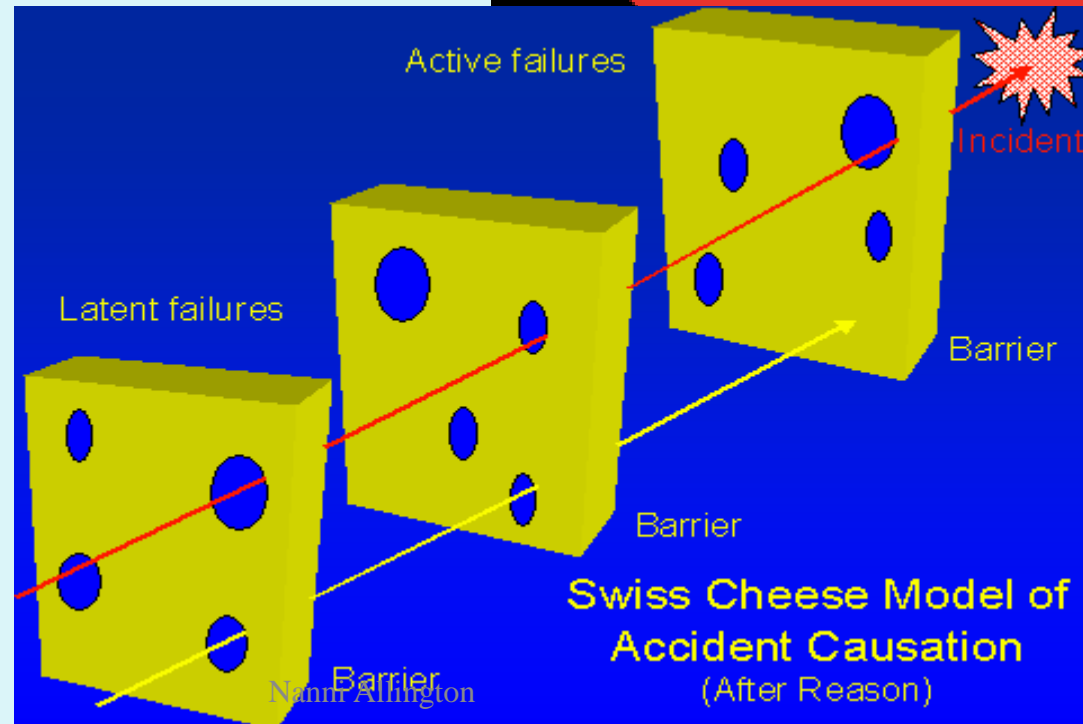
BUT

- Bias in thinking..favor wrong
- Lack of experience
- False hypothesis



Error

- Not intended effect
- Cumulative
- Error Chain Cascade



Other “Errors”

- **Fault** : Machine
Machine has no intention, no goal

- **Violation**
Exceptional or routine
Illegal

low flying...
grey zone



Error management strategies

- Zero error ...failure

- Error reduction – cause removal

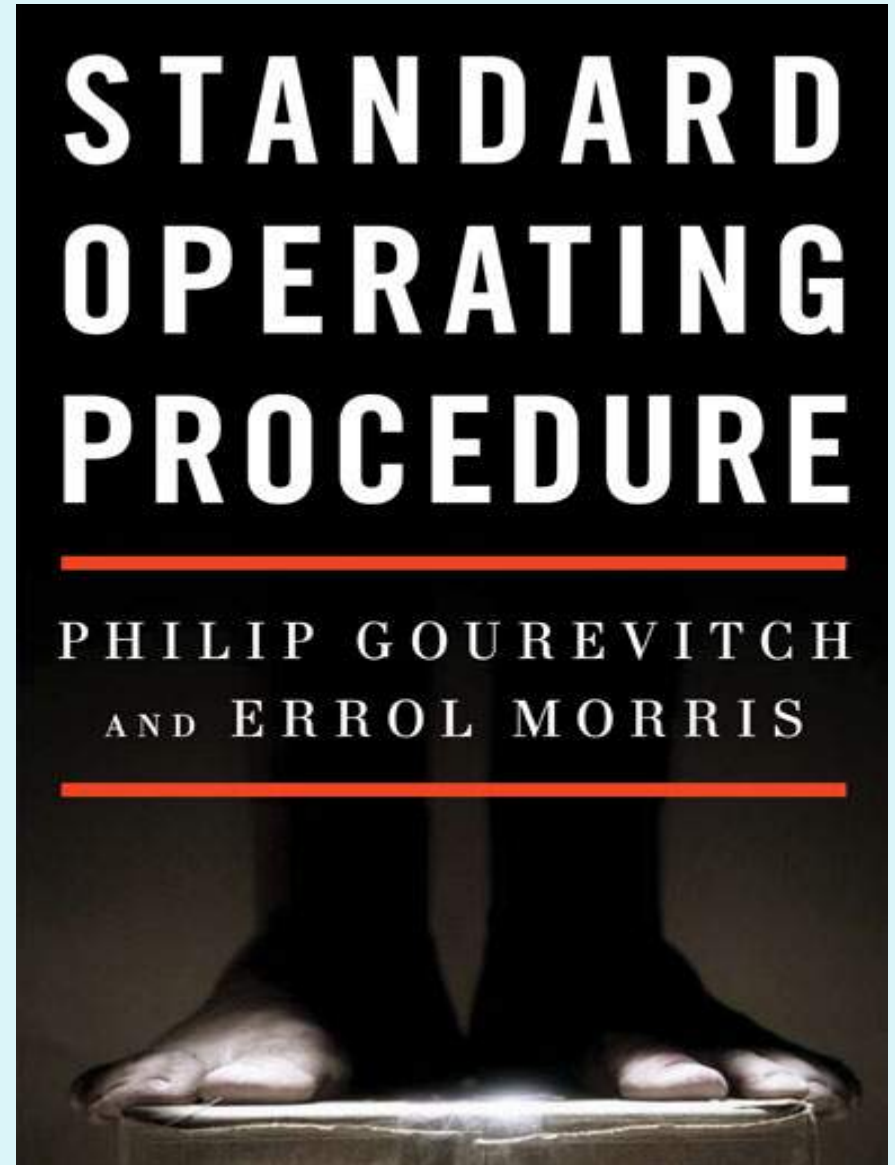
Identify errors... »RMM »

SOP

CRM

Scenario based training

- SMS



Error management strategies

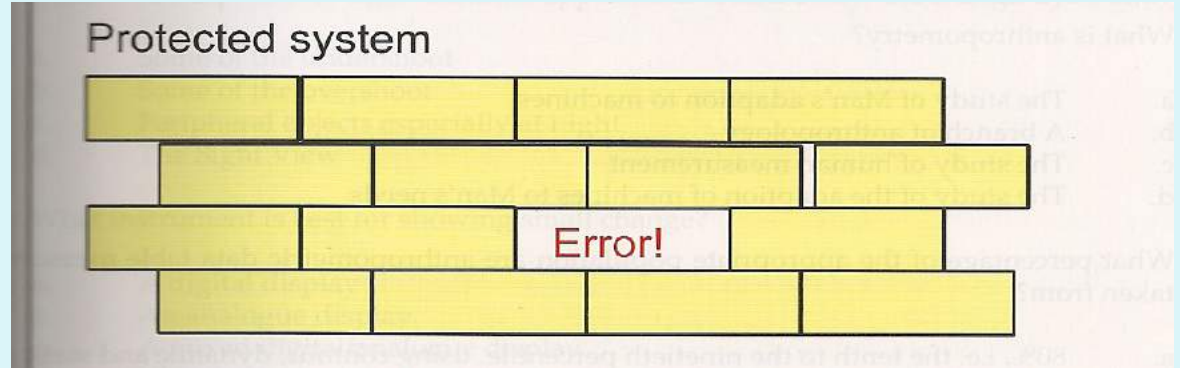
- Automation
Take « human » out of the loop
Routine tasks ...
- Error detection
 - pilot
 - systems
 - crew



Nanni Allington

Error management strategies

- **Error recovery...**
reverse quickly



- **Error Tolerance**

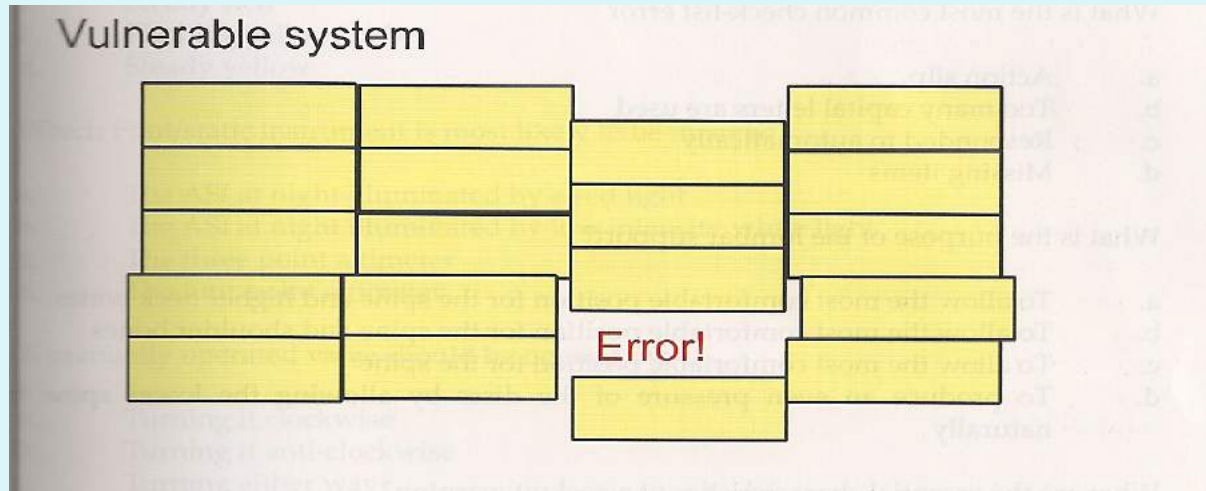
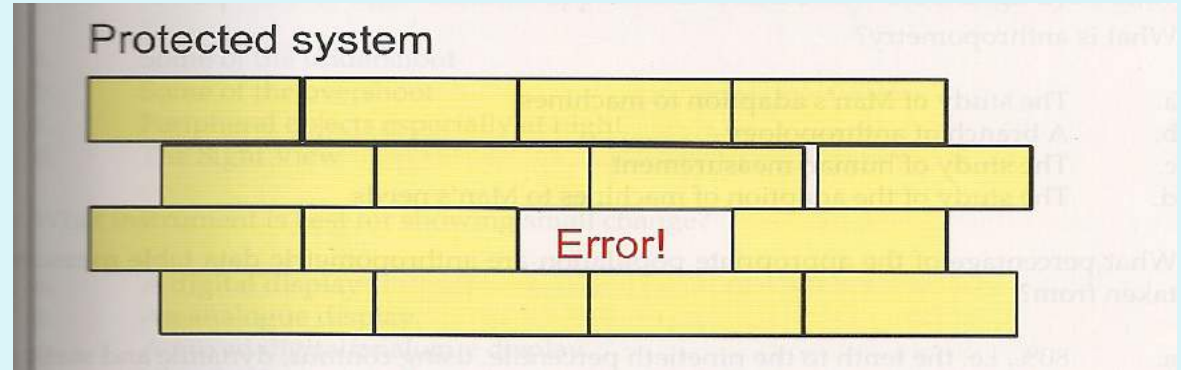
- Conservative « margins » weight and balance.....

- Security margin in medicine....

Workload, patient status with risk factors.

“System” tolerance

- Protected system
- Vulnerable system



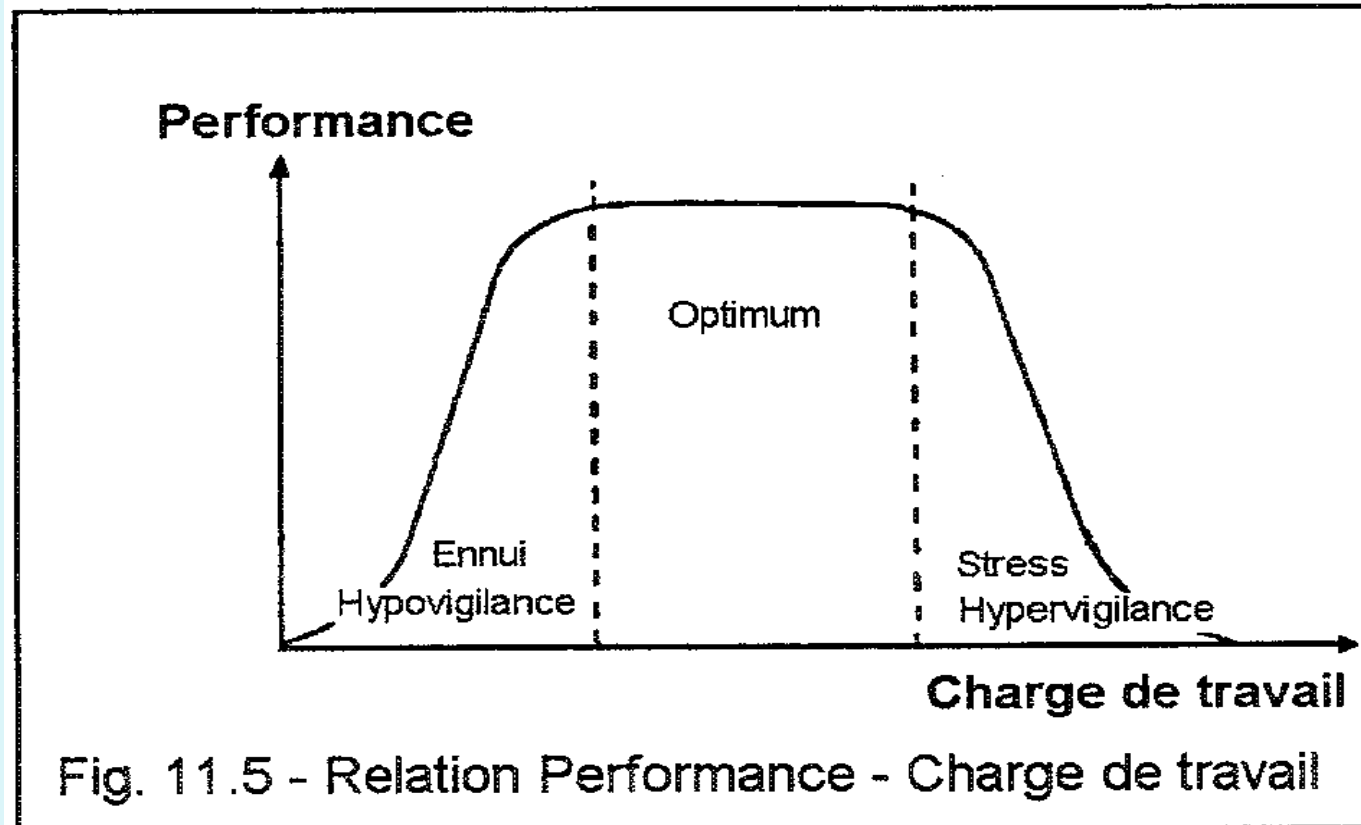
Internal “Factor”

- Poor Motivation

- Low Arousal

- Illness

- Poor workload management



External “Factor”

- Stressors : high workload

Excessive heat / cold...

- Economics

- Social environment
Cultural



Risk assessment

- Go – no go decision



✓ **I'M SAFE CHECKLIST**

Illness -- Do I have any symptoms?

Medication -- Have I been taking prescription or over-the-counter drugs?

Stress -- Am I under psychological pressure from the job? Worried about financial matters, health problems, or family discord?

Alcohol -- Have I been drinking within 8 hours? Within 24 hours?

Fatigue -- Am I tired and not adequately rested?

Eating -- Am I adequately nourished?

Pilot / Doctor	Aircraft/ Patient	enVironment	Ext pressure context
Age, height...	Type / age	Time day	Pleasure
Health	Power / health	Night	Business
Experience	Speed /	Wind / holiday	Photo
Motivation	Weight / obese	Visibility	Friends
Personality	Instruments	ATC/instrument	Family
Attention	Gear	Altitude	
Fatigue	Mechanics	Density	
Intelligence			
Emotion			

Surgeon risk assessment

surgeon, patient, environment, external pressure

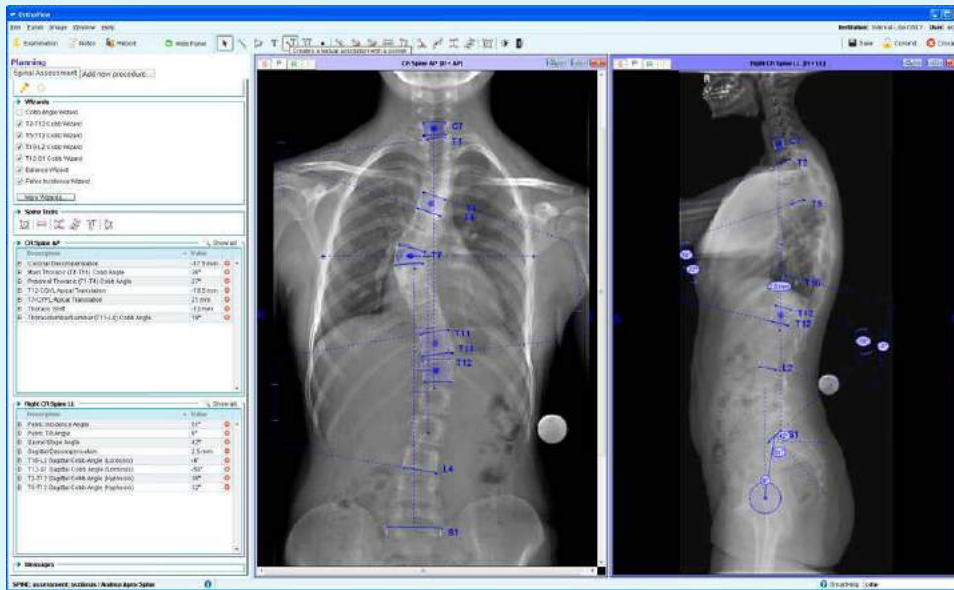
Preparation

Blue Safety Checklist™ | Surgical Safety

BlueCross BlueShield Association
An Association of Independent BlueCross and BlueShield Plans

1 Sign In (Before induction of anesthesia)	2 Time Out (Before skin incision)	3 Sign Out (Before patient leaves operating room)
<p><input type="checkbox"/> Patient has confirmed:</p> <ul style="list-style-type: none"> • Identity • Site • Procedure • Consent <p><input type="checkbox"/> Site marked/not applicable</p> <p><input type="checkbox"/> Anesthesia safety check completed</p> <p><input type="checkbox"/> Pulse oximeter on patient and functioning</p> <p>Does patient have a known allergy?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>Difficult airway/inspiration risk?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> Yes, and equipment/assistance available</p> <p>Risk of >500ml blood loss (Testing in children)?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> Yes, and adequate intravenous access and fluids planned</p>	<p><input type="checkbox"/> Confirm all team members have introduced themselves by name and role</p> <p><input type="checkbox"/> Surgeon, anesthesia professional and nurse verbally confirm:</p> <ul style="list-style-type: none"> • Patient • Site • Procedure <p>Anticipated critical events</p> <p><input type="checkbox"/> Surgeon reviews: What are the critical or anticipated events, equipment, difficulty, anticipated blood loss?</p> <p><input type="checkbox"/> Anesthesia team reviews: Are there any additional risks or concerns?</p> <p><input type="checkbox"/> Nursing team reviews: Has the key (including indicator) result been confirmed? Are there equipment issues or any concerns?</p> <p>Has antibiotic prophylaxis been given within the last 60 minutes?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> Not applicable</p> <p>Is essential imaging displayed?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> Not applicable</p>	<p>Nurse verbally confirms with the team:</p> <p><input type="checkbox"/> The name of the procedure recorded</p> <p><input type="checkbox"/> That instrument, sponge and needle counts are correct (or not applicable)</p> <p><input type="checkbox"/> How the specimen is labeled (including patient name)</p> <p><input type="checkbox"/> Whether there are any equipment problems to be addressed</p> <p><input type="checkbox"/> Surgeon, anesthesia professional and nurse review the key concerns for recovery and management of this patient</p>

Based on the WHO Surgical Safety Checklist, URL: <http://www.who.int/hpsc/prevention/patient-safety>. © 2010 Health-Organization (WHO). All rights reserved. Where information can be found at: <http://www.who.int/hpsc/prevention/patient-safety>, check for updates.



I'M SAFE CHECKLIST

Illness -- Do I have any symptoms?

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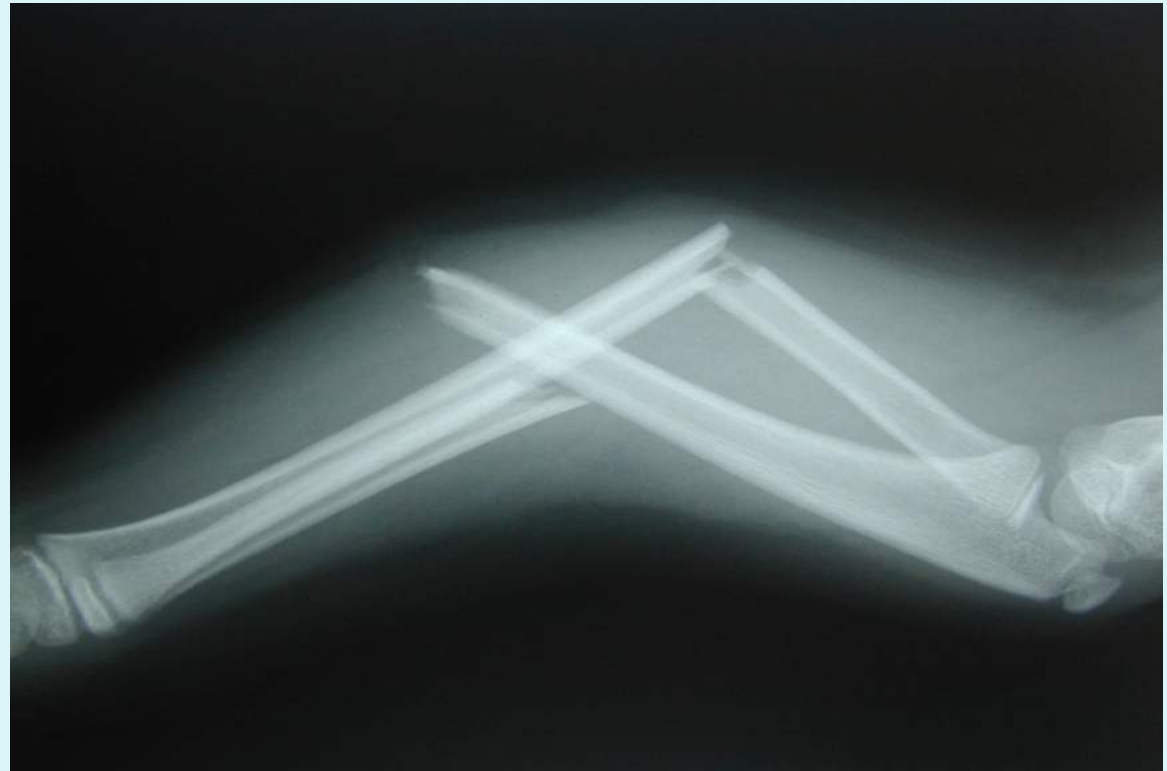
Alcohol -- Have I been drinking within 8 hours? Within 24 hours?

Fatigue -- Am I tired and not adequately rested?

Eating -- Am I adequately nourished?

Surgery ..risk evaluation

- Security margin
- Benefit max
- Risk little



Surgery ...Risk Evaluation

- Scoliosis CP
- Benefit ...not that great
- Risk ...still ok
- The security margin decreases

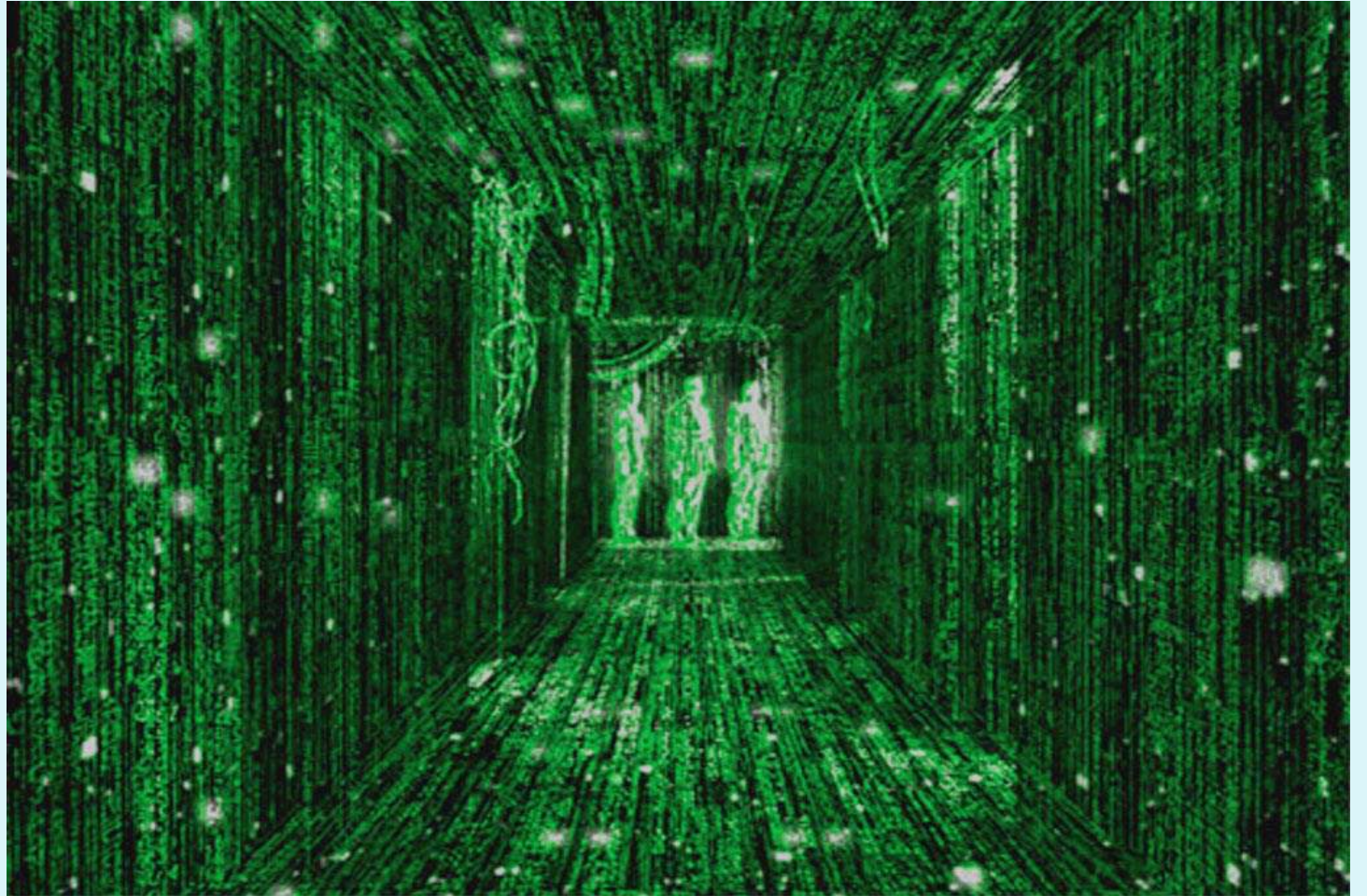


Surgery...risk evaluation

- Scoliosis CP...
- Multiple health risks
- The risks are higher than the potential benefits
- Surgery NO



Man – Machine...Advanced automation



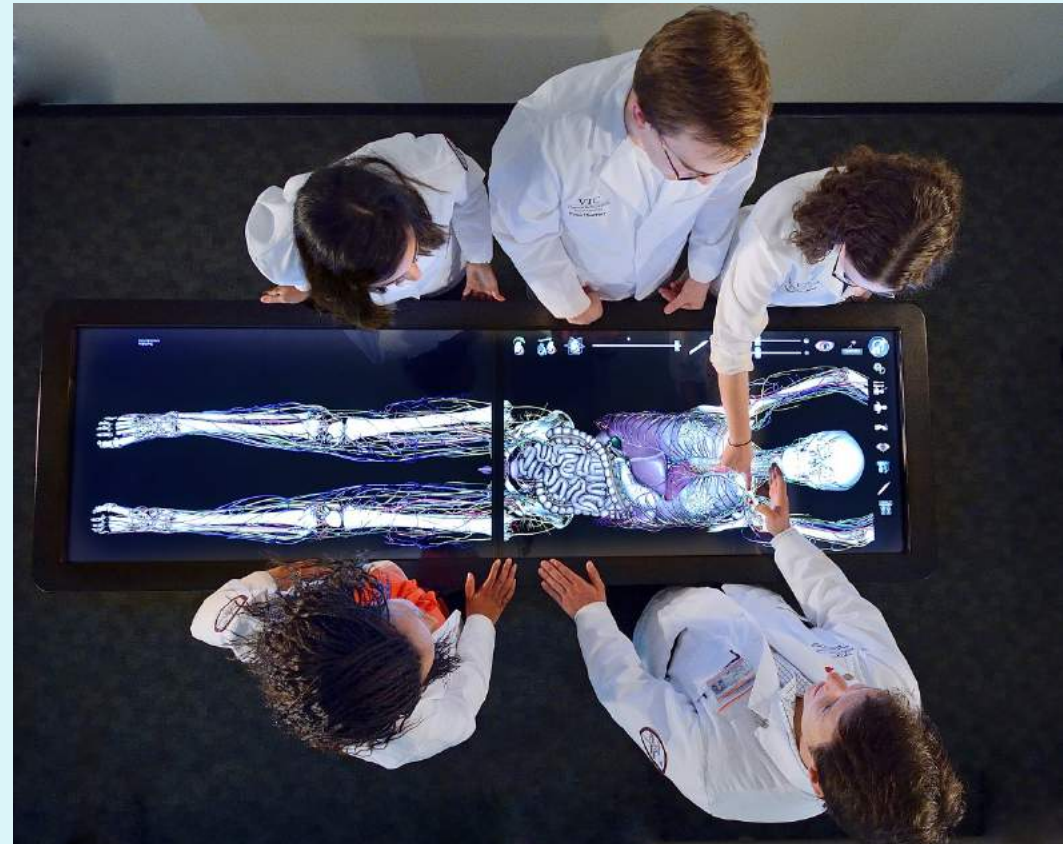
Economics..Simulators In training

- And in Medicine ?
- ...practice without « touching »
- Patient
- Stop
 - Scenarios...



Simulators / Virtual reality in training

- Practice without « touching » Patient
- Scenarios...
- Not all that precise :
muscle function ?
Innervation ?
- Be aware of « marketing »



Factors affecting use of automation

- Intimidation
- Overconfidence on system
- Complacency
- Incorrect mode
- Failure to verify if armed
- Incorrect target
- Incorrect altitude selection
-



Automation- working concept

- Learn to fly the plane « conventionally »
- Aviate, navigate, communicate and manage
- One head up all the time
- PF and PNF monitoring
- Cross check
- Know the system
- **Problem ? Take over !**
- Use correct level of automation
- PRACTICE task sharing



Automation- understand it

- How is it designed ?
- What does it do ?
- Interface with me
- Monitor...supervise



Automation Bias

- Omission : automation does not do certain decision...and pilot thinks it does
- Commission : automation makes decision...pilot does not change it « automation » better than me !




Automation- using it

- Anticipate
- Execute
- Confirm
- Same as with human

KEEPING SHARP

Pilots need to practice manual flying skills as automation can misbehave



Remaining proficient requires self-awareness and dedication to basic airmanship.

ground-based navigational system (at least in US domestic airspace). Although pilots who were trained to fly fixed-card NDB approaches might be able to annunciate the mnemonic that on-course occurs when "the intercept angle equals the deflection," today only a small percentage could fly an NDB instrument approach – much less a hold – to ATP tolerances without some coaching. Nor would they need to. It's a lost art but one that is completely superfluous in the modern era, as even when used to define an airway in international operations, pilots almost assuredly use GPS or a flight management system instead.

However, the fact that a pilot can't perform an NDB approach does not

Pilot flying Airbus 319 on final approach. A visual approach is an opportunity to decouple the automation and assess whether skills have deteriorated.

By Shannon Forrest
President, Turbine Mentor
ATP/CFII. Challenger 604/605,
Gulfstream IV, MU2B

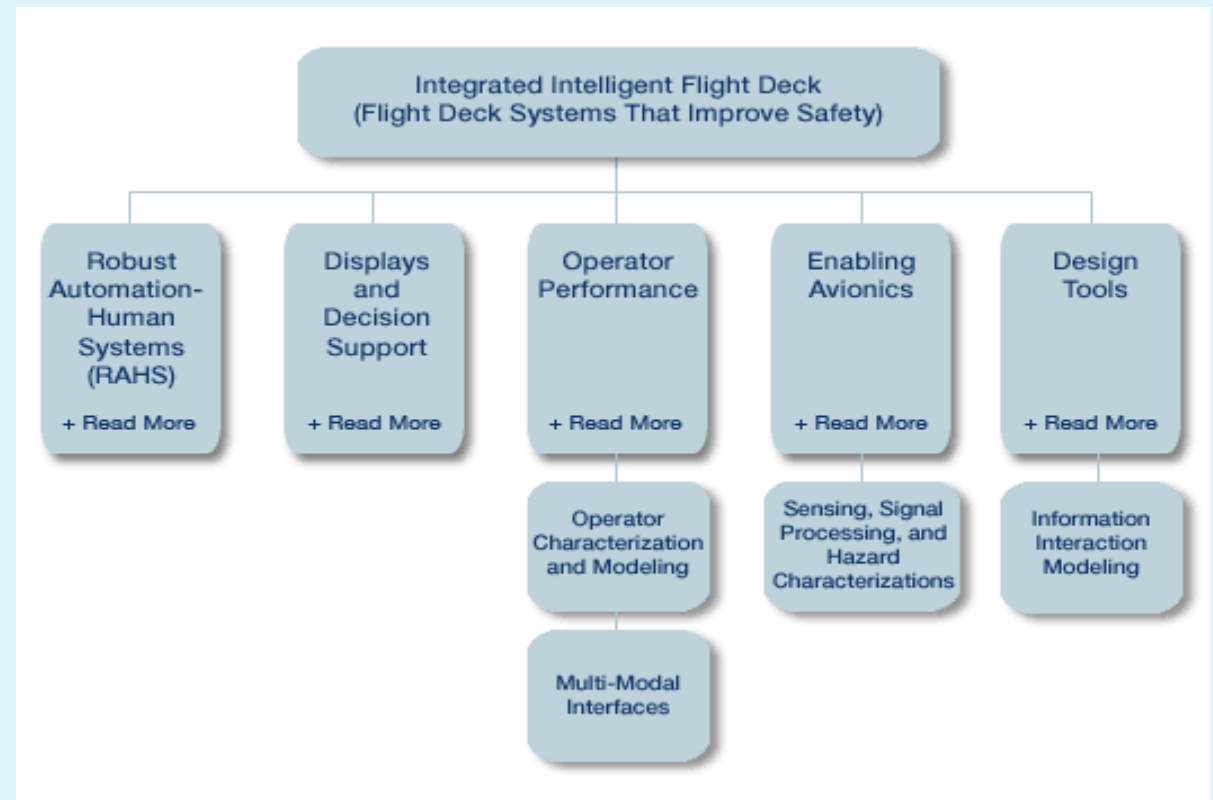
So perhaps the relevant question is twofold: what's your favorite airplane to fly for fun, and what do you prefer to fly for work? A professional pilot that enjoys flying a Piper Cub

- Professional pilot February 2019

“Intelligent” flight deck

- Automated-intelligent
- Computer problem solving
- How far ?

- Take decision without pilot ?
- Quality data ?
- TRUST



“Will you stay in command ? ”

- Plane without Pilot
- Technology is there

ARTIFICIAL INTELLIGENCE

Will you stay in command?

As technology advances, the final authority of the PIC may be reconsidered.




Photo courtesy Aurora Flight Sciences

Aurora Flight Sciences Robotic Copilot aims to insert new automation into existing multi-crew aircraft to permit operations with reduced onboard crew. These types of systems will find their way into aircraft eventually, but will they have overriding authority?

By Peter Berendsen

control center, these systems work

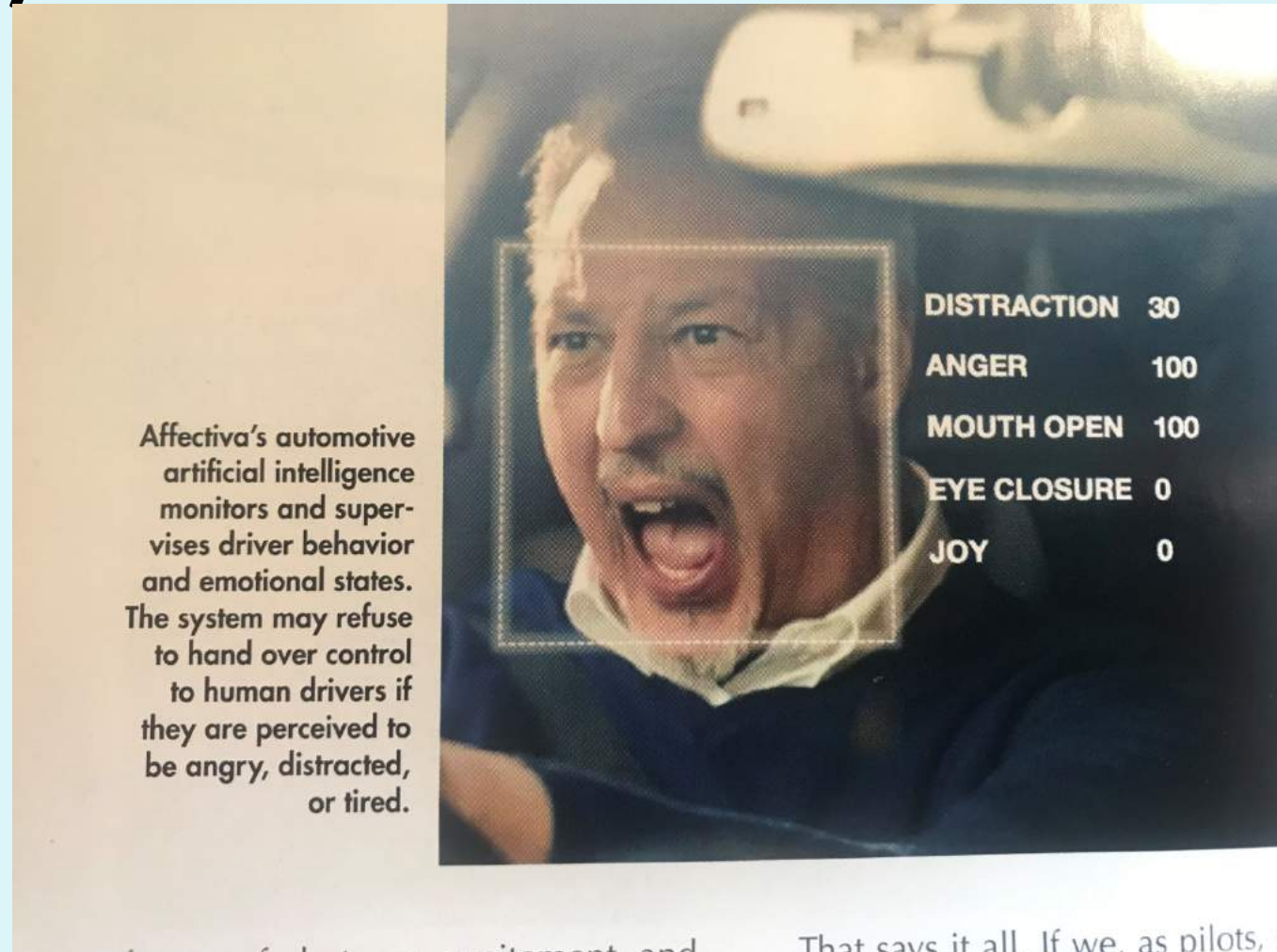
we are entrusted with. The law is clearly on our side: by law, the pilot in command is the final authority on board. The buck stops at the left seat.

However, as we read about recent accidents, such as those involving Boeing 737 MAX aircraft in Indonesia and Ethiopia, some of us may wonder if technology that we were not told about may limit our ability to control the aircraft. But this discussion is not new. When the Airbus A320 was introduced in the late 80s, the fact that there was always a computer between the sidestick inputs of the pilot and the flight control surfaces caused major discussions in the pilot community, as many believed that a true and honest workable surface should always be available even as a last resort in case all hydraulics and flight control computer systems fail.

- Professional Pilot August 2019

“Will you stay in command ? ”

- Watches emotions !



- Professional Pilot August 2019

Will you stay in command





21 19 53 51

21 19 53 51

Basic concept automation

- Assist pilot / doctor
- Pilot / doctor higher level decision...

- Pilot controls
- Pilot aware



Advantages

- Crew input < Less error
- Technical reliability two-three computers redundancy
- Cost savings
- Cockpit size <



Automation

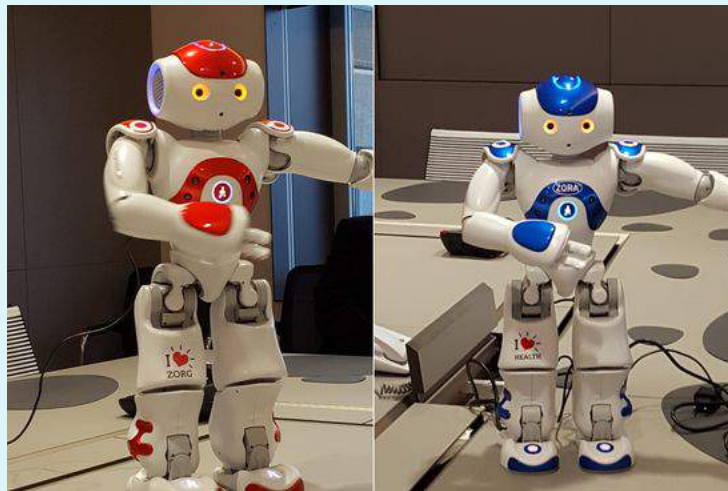
- Activated
- Predetermined sequence of action
- Limited time
- Pilot no control
- Pilot can not deactivate



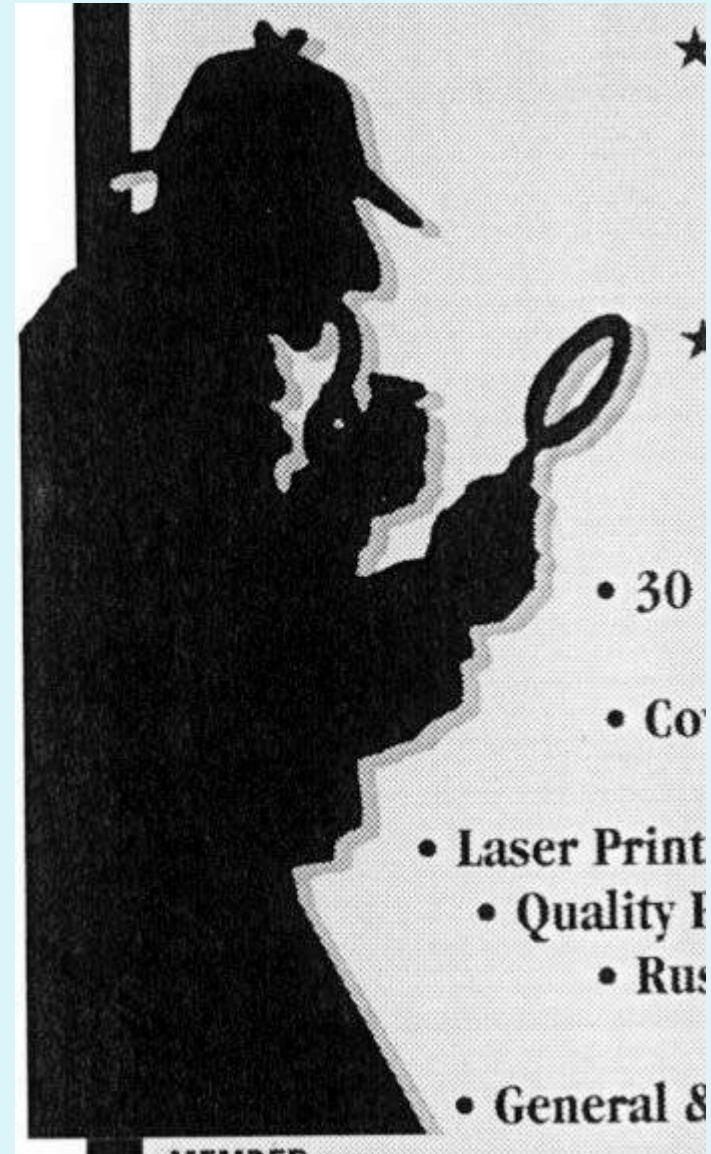
« J'ai voulu remettre les gaz, mais ça a pas répondu... »

....Automation...and us ?...

- *IRM..*
- *Total body scan...*



- History
- Physicals

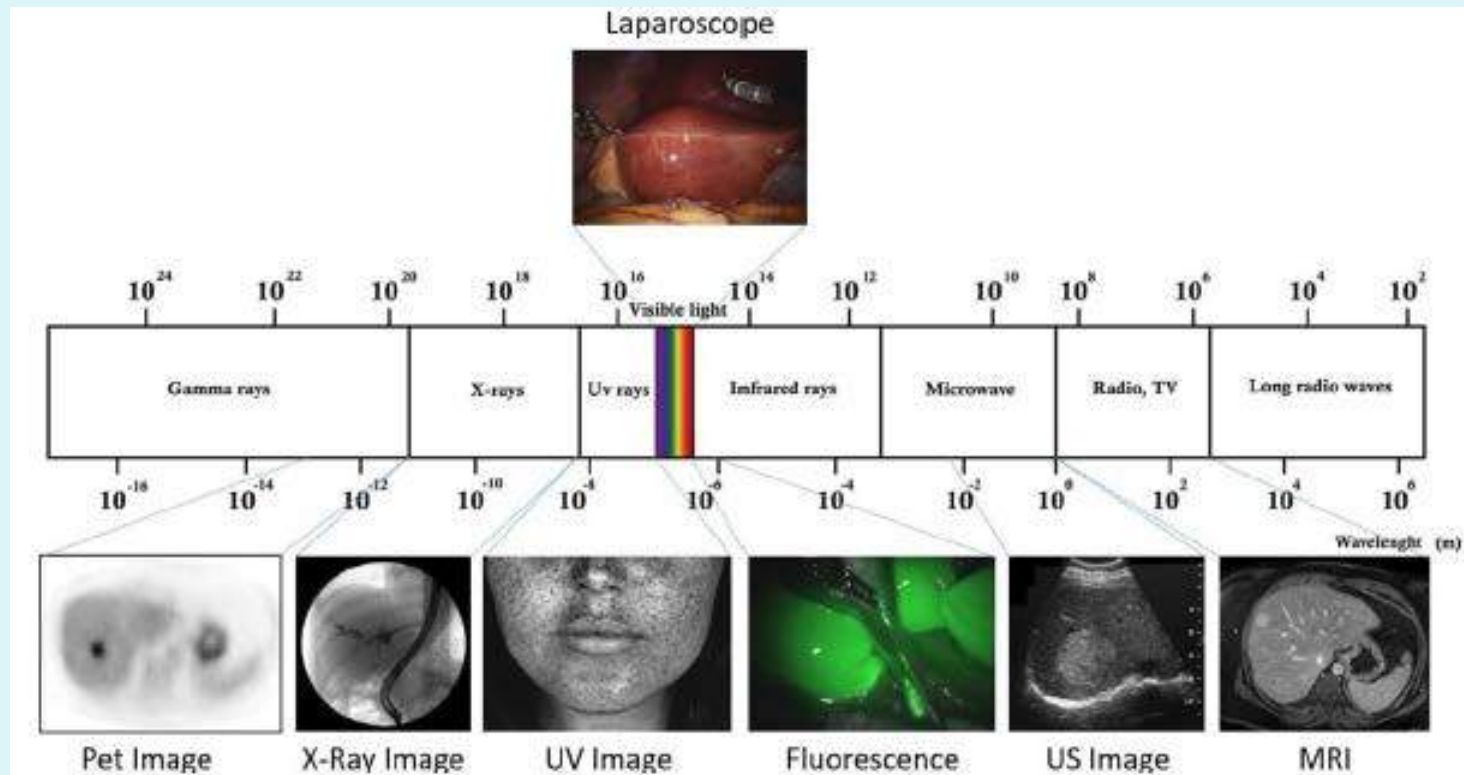


Fractures-Diagnosis....2019

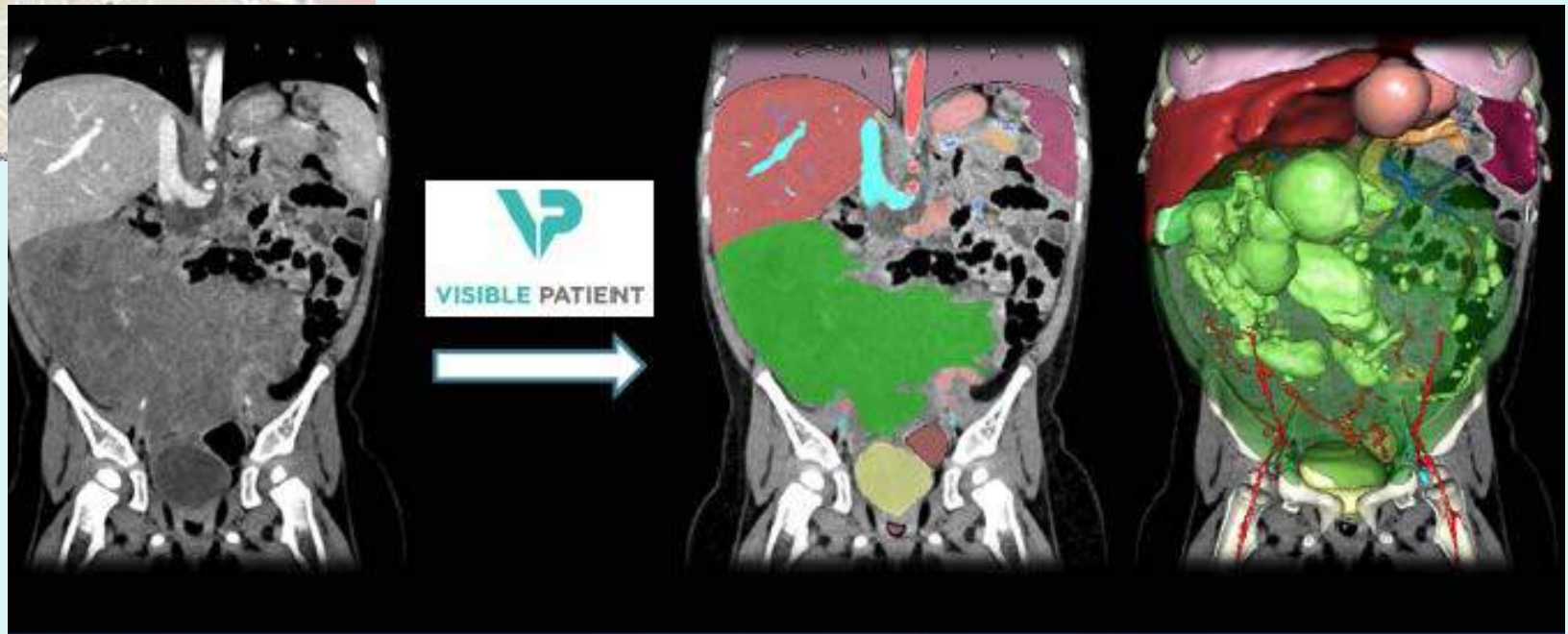
- IRM
- SCINTI
- TOTAL
BODY
SCAN



Pr Luc Soler : The invisible patient Strasbourg



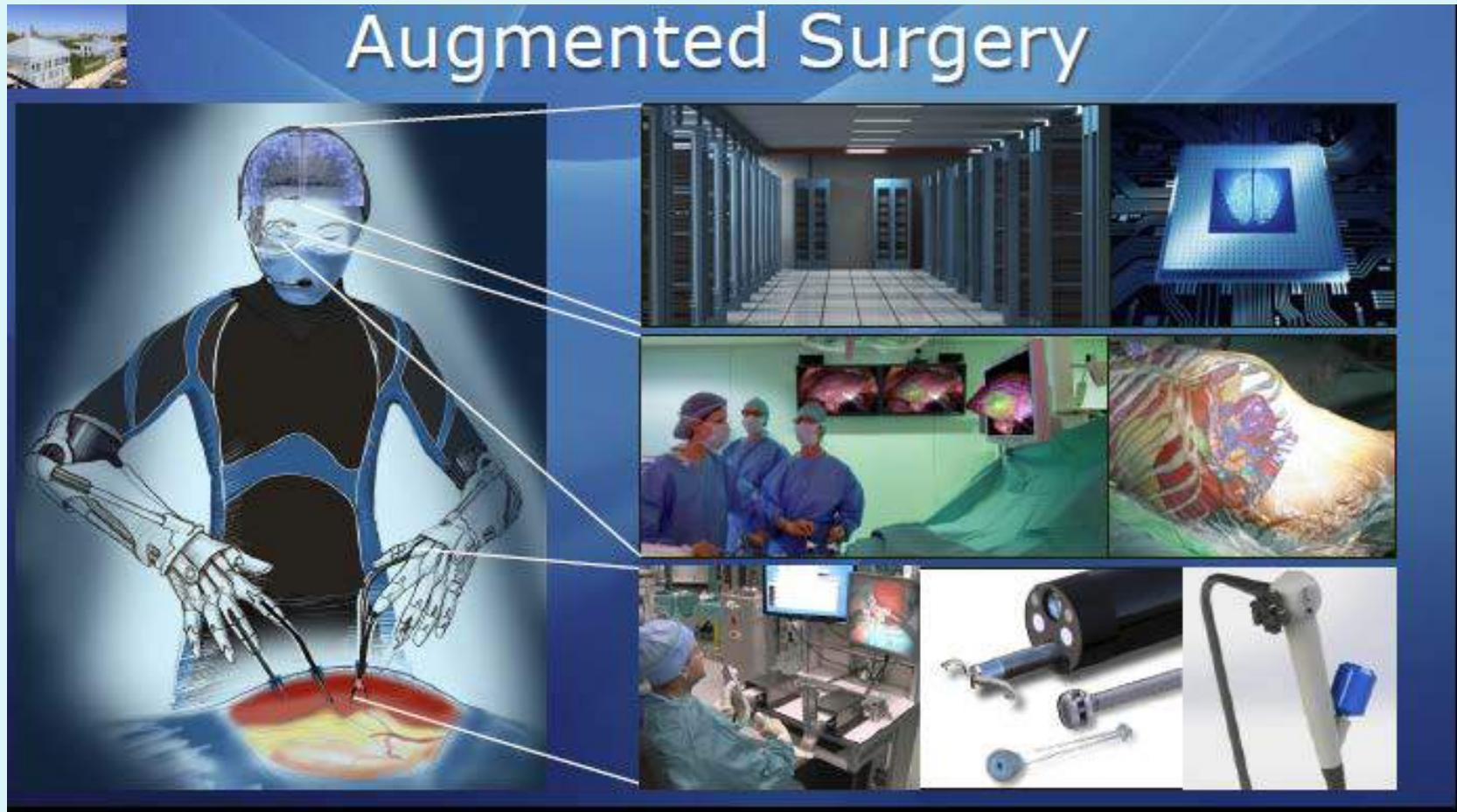
Pr Luc Soler : The invisible patient



Pr Luc Soler : The invisible patient

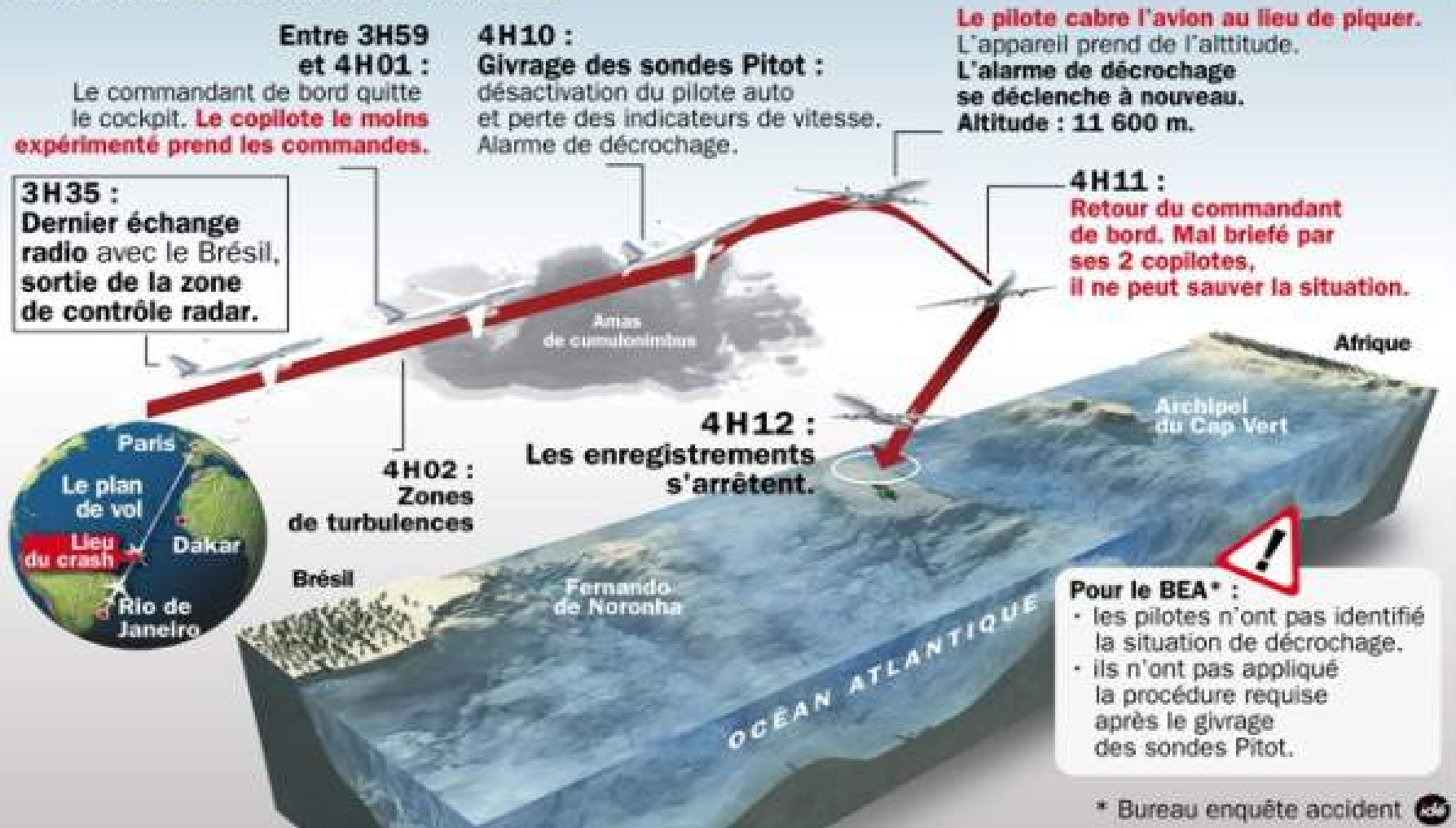


Pr Luc Soler : The invisible patient



Crash du vol AF447 : l'équipage mis en cause

Dans la nuit du 31 mai au 1^{er} juin 2009



● <http://www.youtube.com/watch?v=3ewmMd0C7u8>

● <http://www.youtube.com/watch?v=GYeFdp8S2Qk>

Automation “addiction”

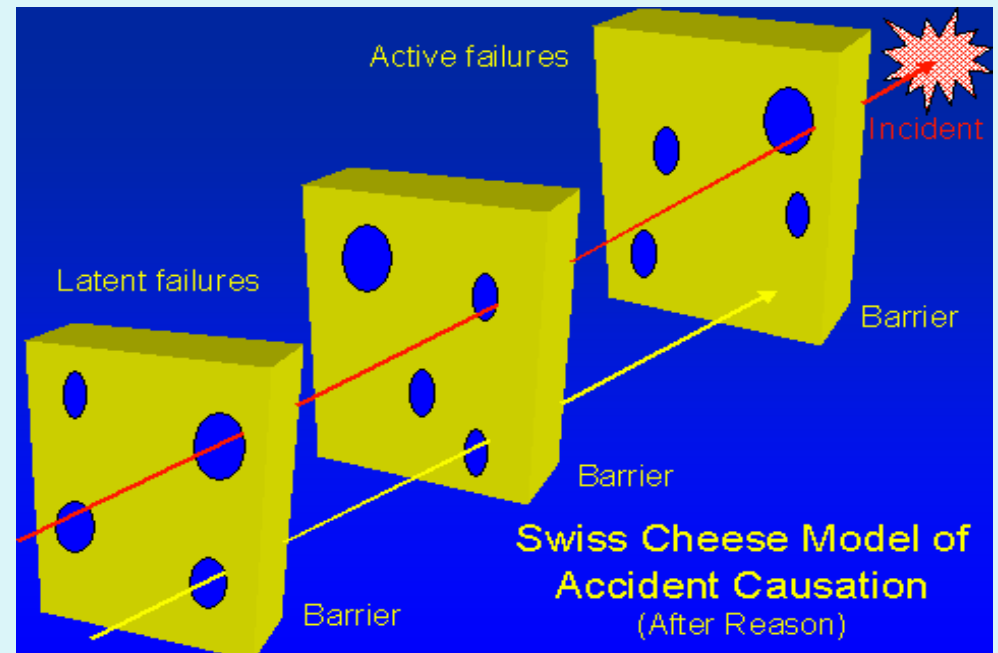
- « Forgetting how to fly »
- « *Specific training is not necessary on Airbus Fly-By-Wire protected aircraft* »
Pierre Baud Vice Président Airbus Industrie
(1998)
- AND US ?

FactsAirbus training update 2015

- Accident involved pilot who, by regulation, were fully trained
- The training received did not prevent the accident
- Re-think training....big changes
- Training is the solution not the problem
- Training was not resilient..

Accidents...

- We know why accident happen...
- Swiss cheese etc ...
- But everything « ok » and still accident
- Resilience





RESILIENCE

Perseverance, no matter what the odds

Definitions of resiliency

- “Ability to bounce back from adversity” (Stuart, 2004)
- “Capacity to rebound from adversity strengthened and more resourceful” (Walsh,1998)
- For a pilot ...be prepared for the unexpected !



We all have difficult times



To build resiliency in children they need:

- love and trust
- food and shelter
- hope and autonomy
- safe haven
- safe relationships



Parents and care givers can promote resiliency by

- Encouragement
- Modeling Behavior
- Enforcing rules
- Providing unconditional love
- Balancing freedom to explore
- Providing a stable environment



What happens the rest of the time?



Why now ?

- Pace of change
- Current economic climate
- Greater expectations – more for less
- Technology



- **People + Performance = Results**

Resilience Skills

- Be patient and slow down
- Know when to ask for help
- Stress can be normal
- Create a plan of action



Why do we need training ?

- Embrace body as whole
- Reduce stress
- Renewed spirit
- Refine executive skills
- Clarity of thinking
- Have Balance & flexibility



BELL 212 Normal and Emergency Checklists		
1 PRE-START		
1. External Interior Inspection (DI + PF Complete)		CHECKED
2. Flaps / Tail Dows	REMOVED / LOCK / SEAL	
3. Cargo / Lock		CHECKED
2 COCKPIT CHECKS- BATS OFF		
Section 1 – Pilot Station		
4. Seat		ADJUSTED
5. Seat Belt	ON / CHECK Inertial Recl	
6. Fecals		ADJUSTED
7. Cycle		CLEANED
8. Doors	As required / CHECK Thrustle	
9. Collective	DOWN / UP / CLD / As required	
10. Collective Switches	NEUTRAL / OFF / As required	
Section 2 – Centre Console		
11. Avionics		OFF / As required
12. Intercom		NORMAL
13. Fuel Keros		NORMAL
14. Boost Pumps		OFF
15. Fuel Valves		OFF
16. Governor		AUTO
17. Fuel Separator		NORMAL
18. Hydraulic		Both ON
19. Landing Gear		DN
Section 3 – Main Panel (Left to Right)		
20. Gauges		STATUS
21. Stand by Altimeter		SET
22. Fire T-Handles		IN
23. Fire Extinguisher		OFF
24. Engine / Gear Box Gauge		STATUS
25. Primary Altimeter		STBY
Section 4 – Overhead Panel (Back to Front)		
26. Breakers		IN
27. Pitotstatic		OFF
28. Switches		OFF / As required
29. Instruments / QI		Both OFF
30. Callbells		Both OFF

Benefits...for the individual

- Increase confidence, self-worth and personal
- Thus enhanced performance
- Advanced communication skills
- Raised self-awareness leading to a change in attitude and mind set
- Improved morale & motivation
- More engagement – less ‘presenteeism’
- Greater behavioural flexibility in order to build better business relationships

- An improved ability to manage and respond positively to pressure and stress



Benefits for the organisation

- Reduced costs associated with ill-health, absenteeism
- Retention of employees
- Setting the standards for new people joining the business
- **A consistently high performing workforce**
- Achievement of results, turnover and profit



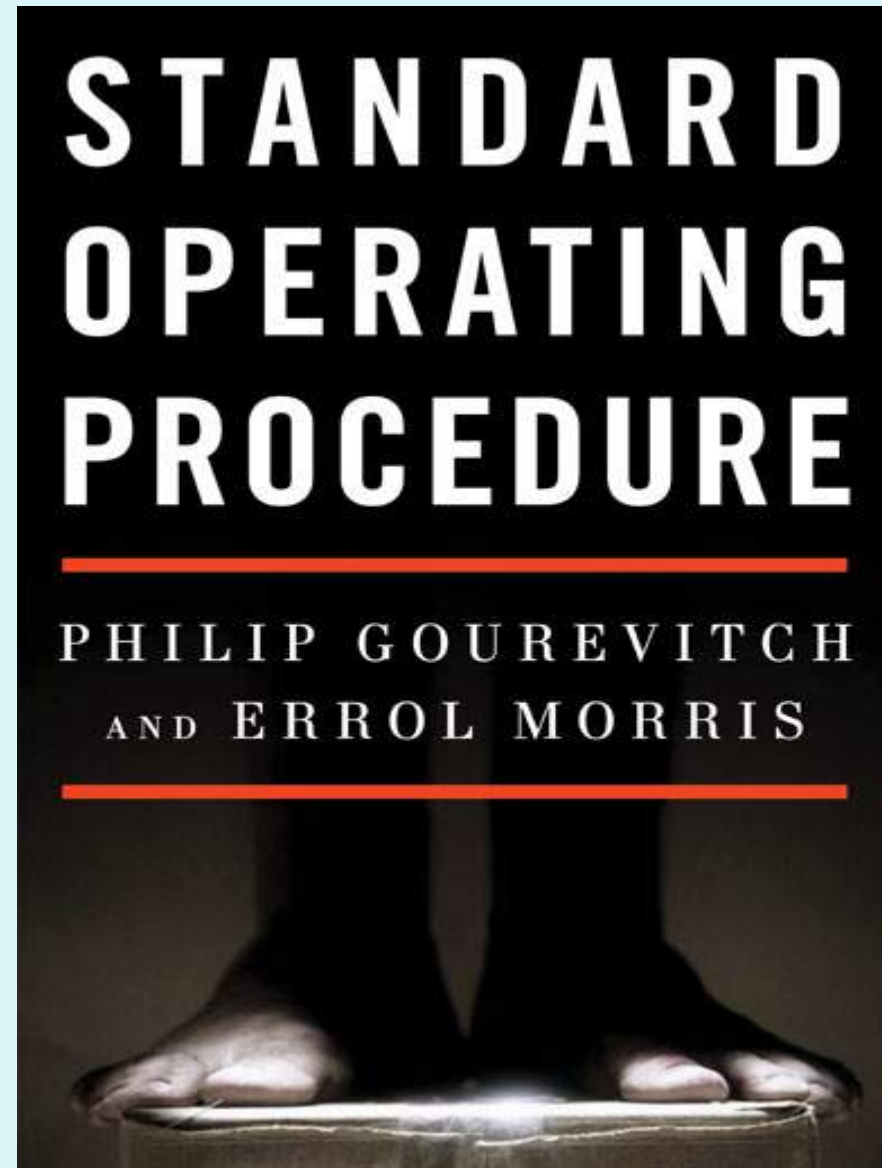
Traits of Resilient Companies

- Commitment
- Time Together
- Respect
- Connectedness
- Adaptability
- Communication
- Cohesion



Intellectual Domain

- Decision Making
- SOPs
- Seek challenges
- Keep mentally active





Navy Resilience

Mental Health in the Military

Treatment



Wellness



Resilience

- Culmination of all our:
Experience and ability
The competencies applied in real life!
- Thinking outside the box..



IF THINGS DO NOT GO AS
EXPECTED

**TAKE
Pilot Monitoring
ACTION!**

Why are pyramids so strong



Resilience Pyramid



SA

Task Sharing

Communicate

Navigate

Fly - Automation

Fly – Manual Strong Foundation

- Threats
- Errors
- Distraction
- Startle
- Fatigue

Monitoring

Resilience

Principles of Learning

- Readiness
- Exercise...Experience... »I'll never do that again »...How to transfer ?
- Effect
- Primacy
- Intensity
- Recency



Why is training not so resilient today ?

- Training is a process of passing experience
- Good DM comes from real world experience
- Pilot ...past ...lot of experience
now less « real events »...less « exposure »
- Exposure ! is the challenge !

...Tailored training

- Learning is individual
- Functional approach...
- Individual courses
- Designed by the individual himself

- Evidence Based Training

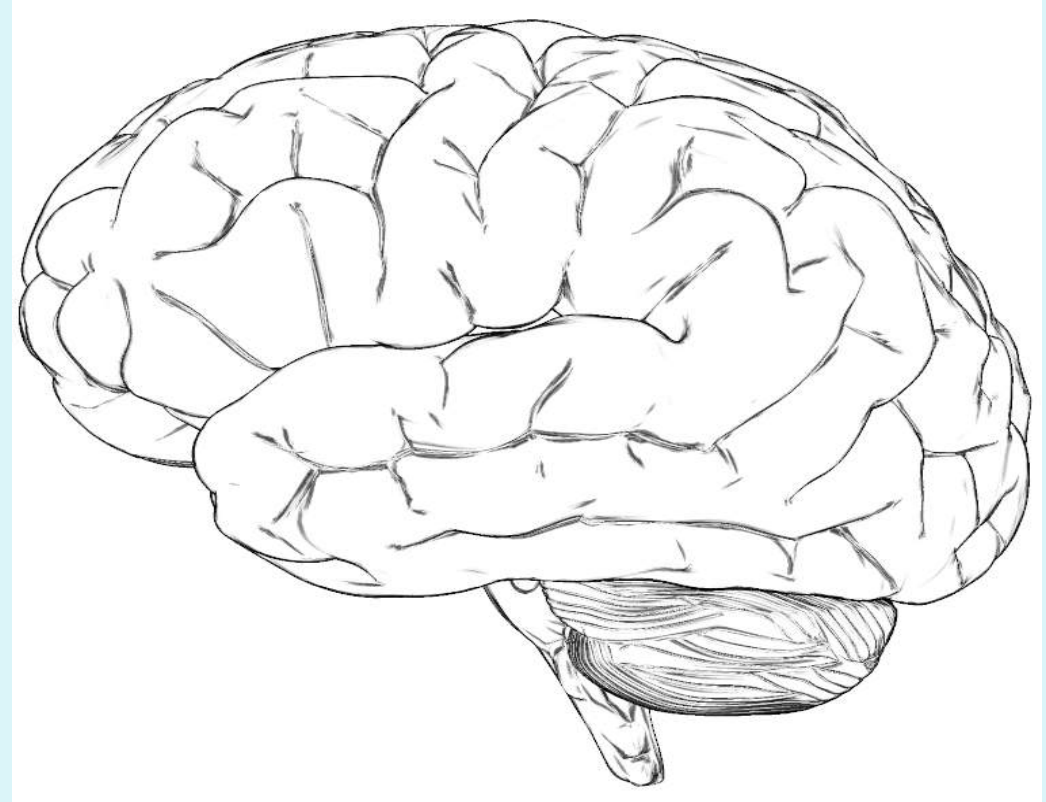


Evidence Based Training

- Pyramid...Airbus slides...here...
- **Decision Making**
- Golden rules
- Emergencies
- FLY THE AIRCRAFT
- Not just delivery of pure knowledge !

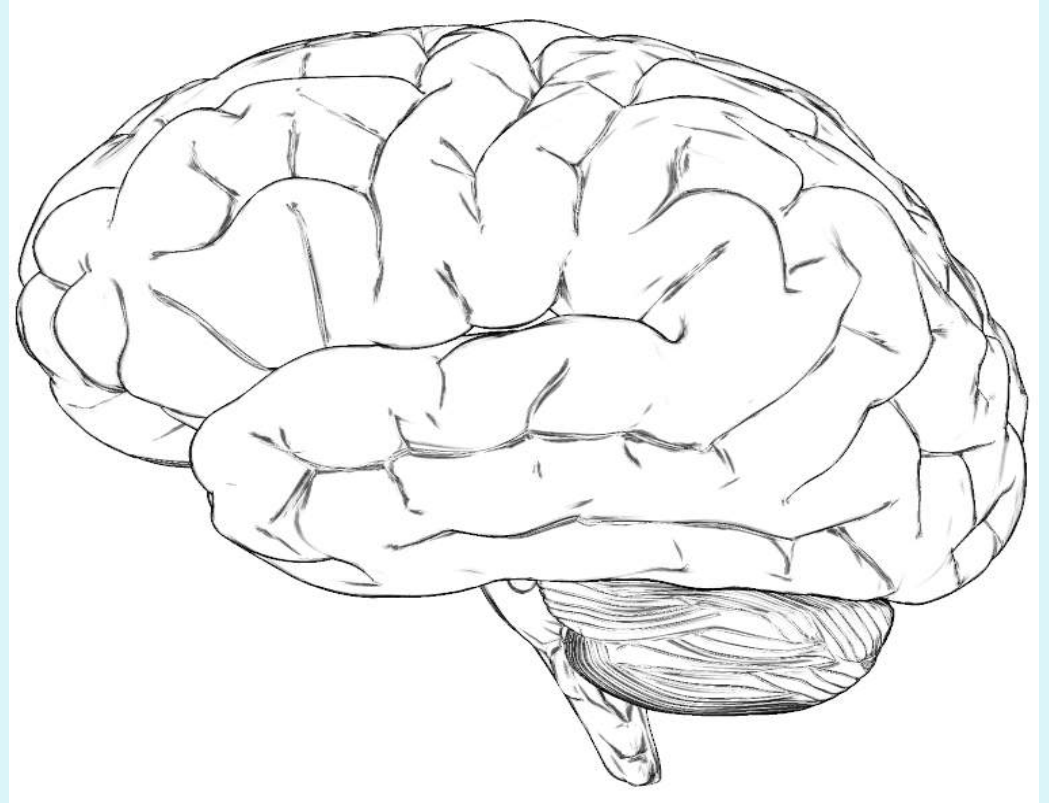
Decision Making

- Commit to a course of action
- Decision
Arbitrary
Emotional
- Decision Making
Step by step process
Balanced and factual
Decision
Judgement concept



Mistake

- Result of failed plan of action
- Not a good plan
- Wrong plan
- Faulty decision
- **WRONG SEQUENCE**



Central Decision Process

- Skill
- Creative
- Innovative

- Cope novel situation
Human > Machine



How to confirm resilience / How to evaluate

- Realistic scenarios
- Not the immediate recall of the lesson
- Evaluate in real situation not just perform
« manoeuvres »
- Evaluate 6 months later !

How do we confirm resilience ?

- Training scenarios ...White Swans
- But ...Black Swans...
- We can not train for every possible scenario...but need to train to deal with every situation....!



Resilience at Work



Qantas QF32 - Uncontained failure of No.2 engine



Shrapnel punctures;

- Wing
- Fuel system
- Hydraulic system
- Brakes
- Flaps
- Engine controls



Resilience at Work

“AFTER FINDING THE PLANE CONTROLLABLE”



50 mins

1 hr **45** mins

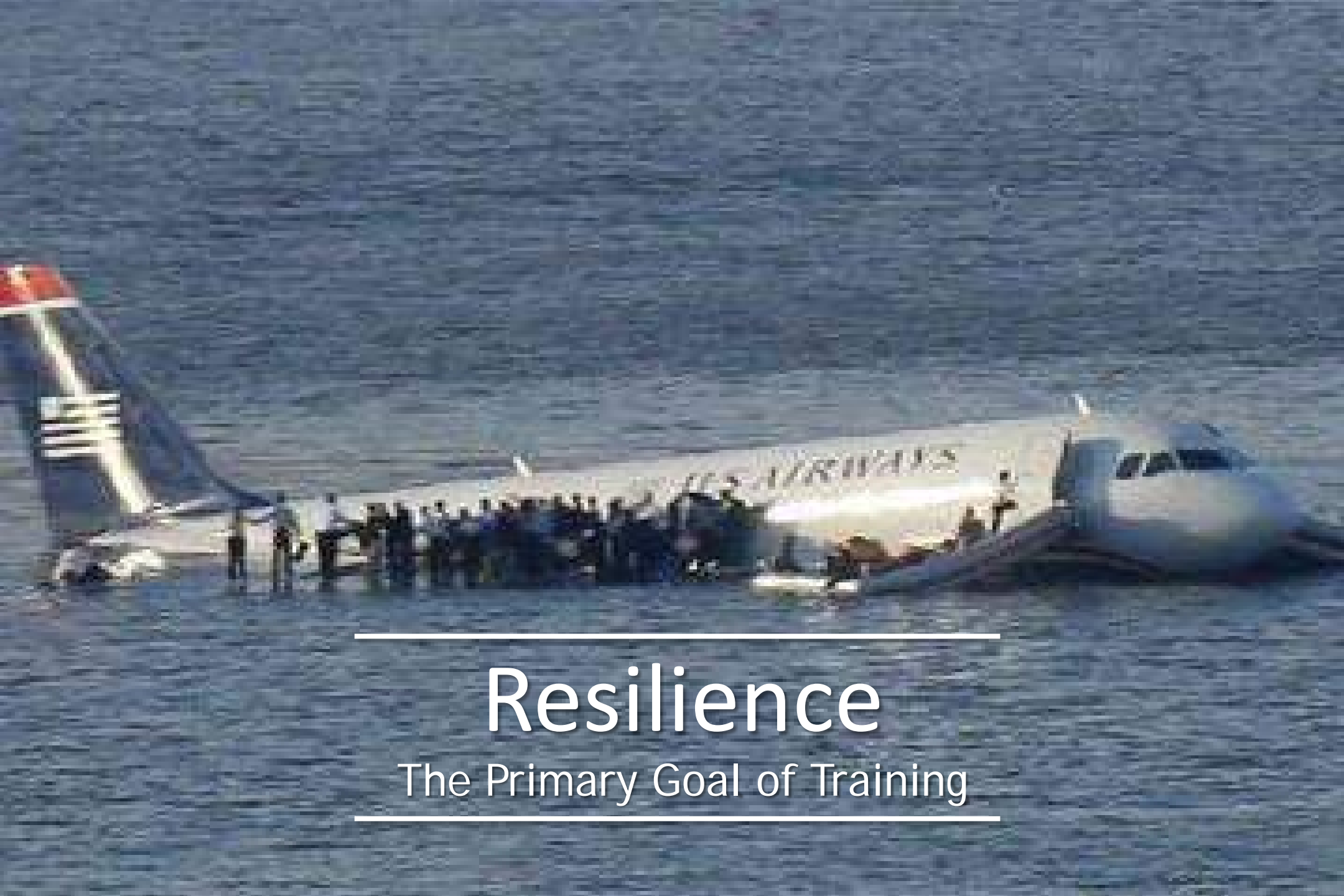


“We’ve got a situation where there is fuel, hot brakes and an engine that we can’t shut down and really the safest place was on board the aircraft until things changed.”



“I never knew in 42 years that there would be 208 seconds on which my entire career would be judged.”

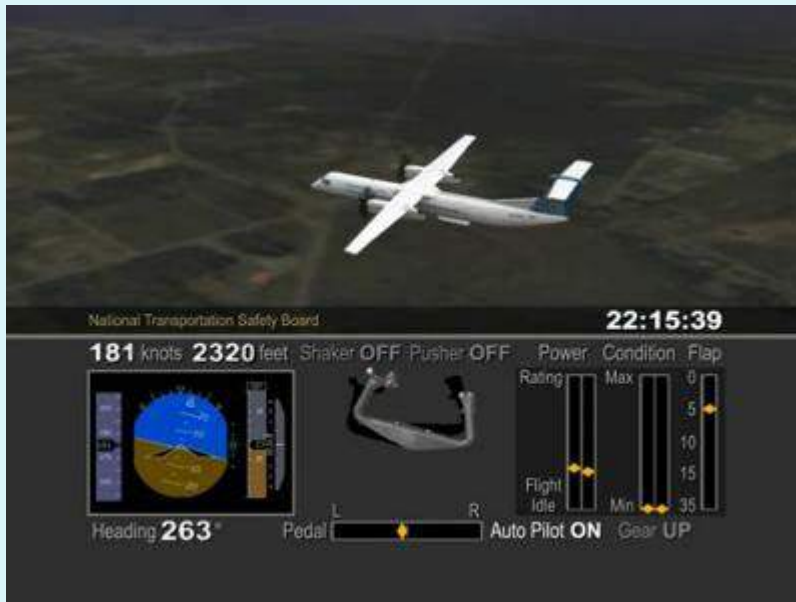
Sullenberger



Resilience

The Primary Goal of Training

Colgan 2009



Safety Recommendation.....! Fatigue

Fatigue !!!!

- Alcool
8 hours
- Sleep
16 hours awake = 2 glasses
of alcool

Do not flySLEEP

Et nous ...Loi Colla



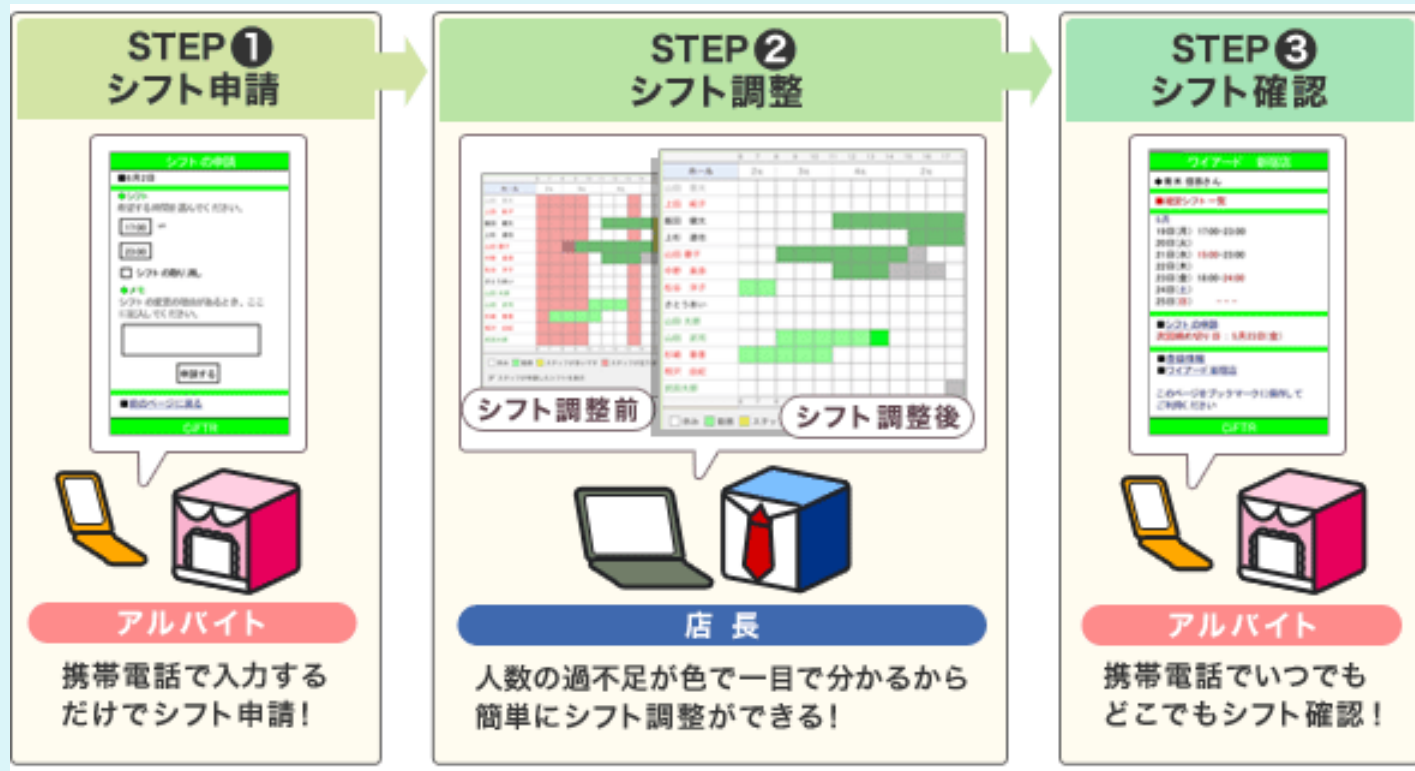
Lindberg

« The whole body argues that nothing , nothing life can attain , is quite so desirable as sleep »

After 9 hours within is 33 hours journey...

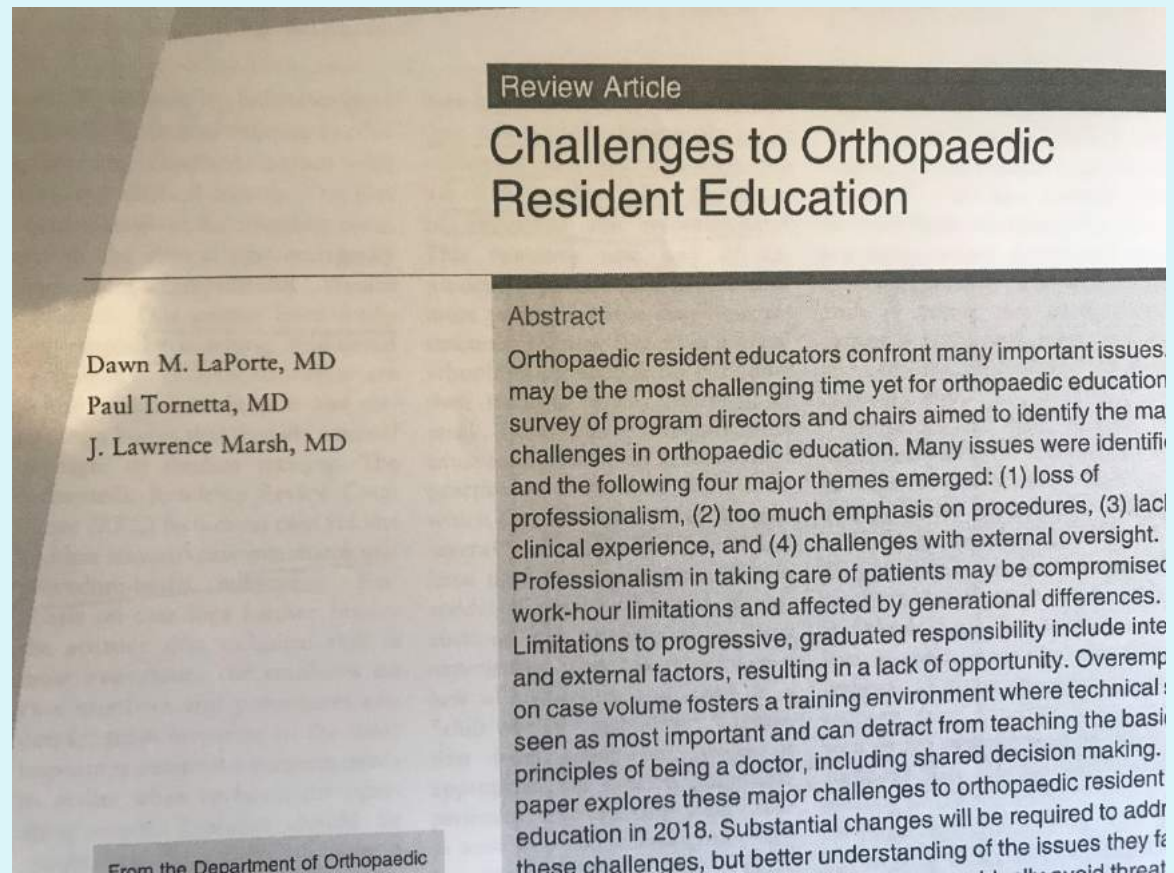
Shift Work

- Sleep loss
Partial sleep
- Circadian rhythm
- Shift rostering
- Early shift to
Late shift
- Late shift to
Night shift



Challenges !

- American Academy of Orthopaedic surgeons. June 15, 2019, Vol 7, N 12
419-425



Challenges !

- American Academy of Orthopaedic surgeons. June 15, 2019, Vol 7, N 12
419-425
- Loss of Professionalism
- Too much emphasis on procedures
- Lack of clinical experience...decision making
- Continuity of care...shift work...team approach

Communication !



Nanni Allington

Communication !



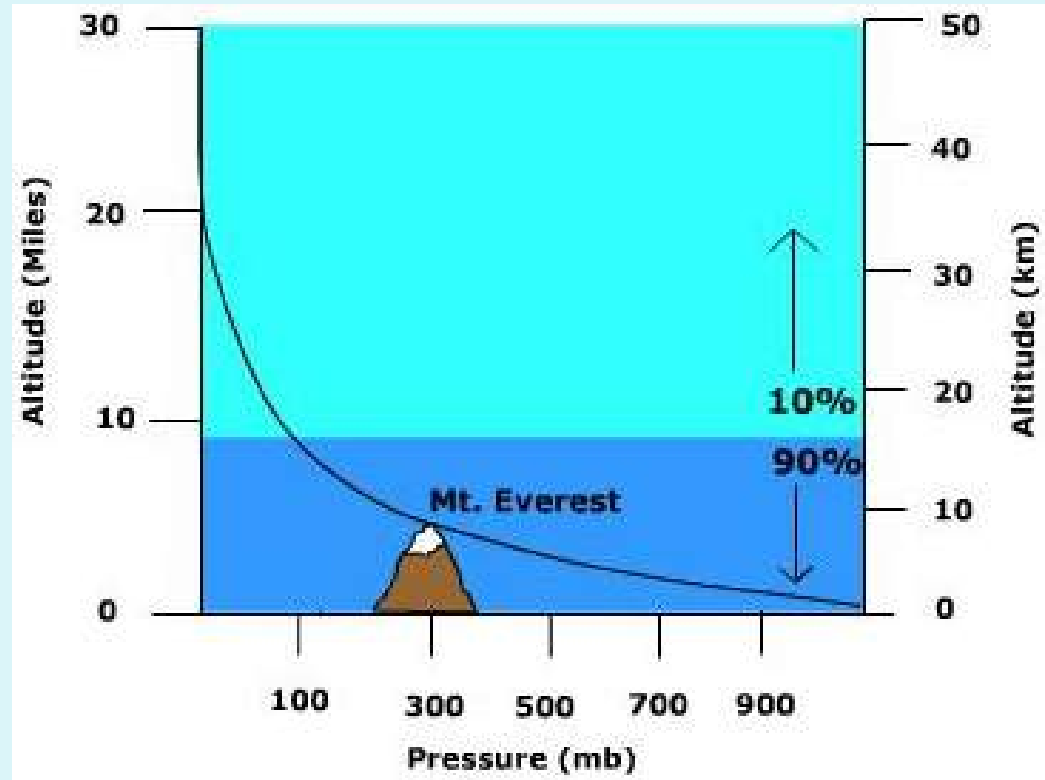
Nanni Allington

«How do we perceive »

- Create a mental model
- Mandatory for situational awareness...
“Etre sur la même longueur d’ondes”
- Individual
- Group
- A simple wordpressure

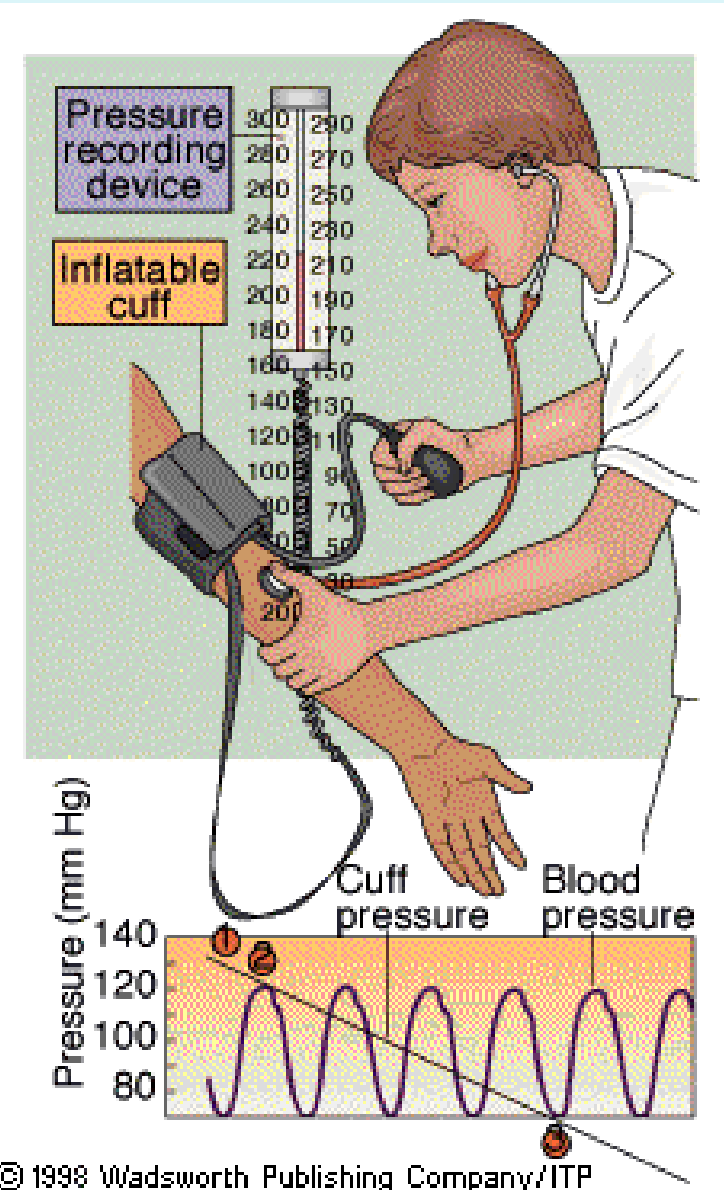
« Pressure »

...Pilot...



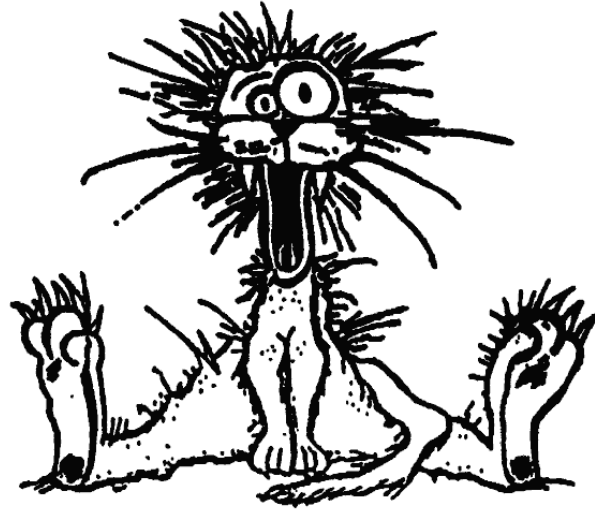
« Pressure »

....Doc...



« Pressure »

....Psy...



"STRESS"

THE CONFUSION CREATED WHEN
ONE'S MIND OVERRIDES THE
BODY'S BASIC DESIRE TO CHOKE
THE LIVING DAYLIGHTS OUT OF
SOMEBODY WHO DESPERATELY
NEEDS IT !

« Pressure »



« Mental Model »

- Mandatory for situation awareness
- Individual
- Group
- A car with a horse.....

Mental Model



Mental Model



Studham, Bedfordshire: 01582 871023 / 07973872610

Mental Model



Mental Model



HORSEPOWER

Because too much is never enough





**LIEGE
SOUS LA
LA PLUIE**

Altzeimer test.

Confusion...memory

- **S_XE**
- **B__SER**
- **P_NIS**
- **__CULER**
- **SAL__E**
- **JOU_R**
- **_APOTE**

S_XE = SAXE

B__SER = BRISER

P_NIS = PUNIS

__CULER = RECULER

SAL__E = SALADE

JOU_R = JOUER

_APOTE = PAPOTE

Sorry if you had it wrong...no treatment

UN B34U JOUR D'373, J'37415 5UR L4 PL4G3 37 J3 R3G4RD415
D3UX J3UN35 F1LL35 JOU4N7 D4N5 L3 54BL3. 3LL35
CON57RU15413N7 UN CHÂ734U D3 54BL3, 4V3C 7OUR5,
P4554G35 C4CH35 37 PON7-L3V15. 4LOR5 QU'3LL35
73RM1N413N7, UN3 V4GU3 357 4RR1V33 37 4 7OU7
D37RU17, R3DU154N7 L3 CH4734U 3N UN 745 D3 54BL3 37
D'3CUM3 J'41 CRU QU'4PR35 74N7 D'3FFOR7, L35 F1LL37735
COM3NÇ3R413N7 4 PL3UR3R, M415 4U CON7R41R3 3LL35
COURRUR3N7 5UR L4 PL4G3, R14N7 37 JOU4N7 37
COMM3NÇ3R3N7 4 CON57RU1R3 UN 4U7R3 CHÂ734U. J'41
COMPR15 QU3 J3 V3N415 D'4PPR3NDR3 UN3 GR4ND3
L3ÇON.. NOU5 P455ON5 UN3 GR4ND3 P4R713 D3 NO7R3
V13 4 CON57RU1R3 D35 CHO535 M415 LOR5QU3 PLU5 74RD
UN3 V4GU3 L35 D3MOL17, L35 53UL35 CHO535 QU1
R3573N7 5ON7 L'4M1713, L'4MOUR 37 L'4FF3C71ON 37 L35
M41N5 D35 G3N5 QU1 5ON7 C4P4BL35 D3 NOU5 F41R3
5OUR1R3.

Perception

- Past experience
- Fill in missing info
- No machine ..
Can see the dog !



Figure 8.6

No computer image detection software would be able to detect the dalmatian dog in this image

