

# **KSAK Motorflygkonferens 2024**

**Hur kan vi bli bättre i cockpit och vad kan jag göra mer av?**

**Lars Sveding, 5 oktober 2024**

# Glad to be here!

- John "Gucci" Foley
- Flying is not dangerous, it is unforgiving!



# Human Factors

- Egen vetenskap - mänskliga faktorn konstigt använd i media
- Multidisciplinary field (se nästa bild) - fel spak vid intaxning (40-talet)
- Fysiologi och psykologi samt ergonomi (förutsättningar och begränsningar)
- Överlappningen med Safety Science (Three Mile Island/Harrisburg 1979)
- Tenerife 1977 (KLM/Pan Am), Portland 1978 (United)
- Behaviorism - första kognitiva revolutionen (input - output)
- Information processing - andra kognitiva revolutionen (opening the lid)
- Joint cognitive system of work - tredje kognitiva revolutionen (interaction/co-ordination)

# Crew Resource Management

- Cockpit..., Crew..., Team..., Company...
- The effective utilization of all available resources applied to achieve safe and efficient operations
- Resources - team members, airplane systems, supporting facilities and persons
- Emphasis on non-technical aspects of team performance

# Pilot Core Competencies

- Situational Awareness
- Leadership and teamwork
- Effective Communication
- Workload Management
- Problem Solving and Decision Making
- Flight Path Management - Automation
- Flight Path Management - Manual control
- Application of Procedures
- Knowledge



# Värt att veta

- Startle and surprise
- Upsets - onormala lägen
- UAS - Undesired aircraft states
- CFIT - Controlled Flight Into Terrain
- LOC-I - Loss of Control in Flight
- TEM - Threat and Error Management

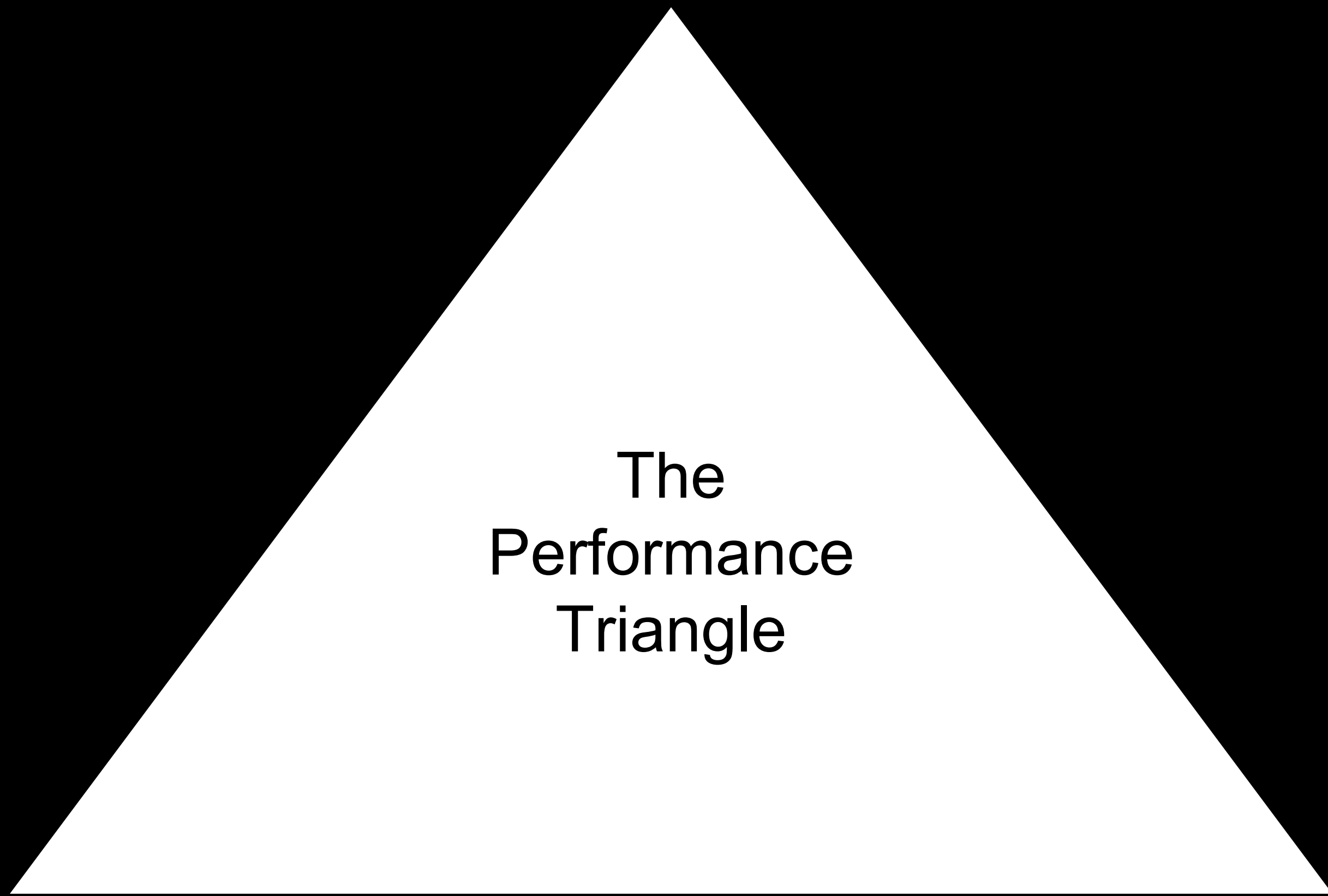


Knowledge

The  
Performance  
Triangle

Attitude

Skill

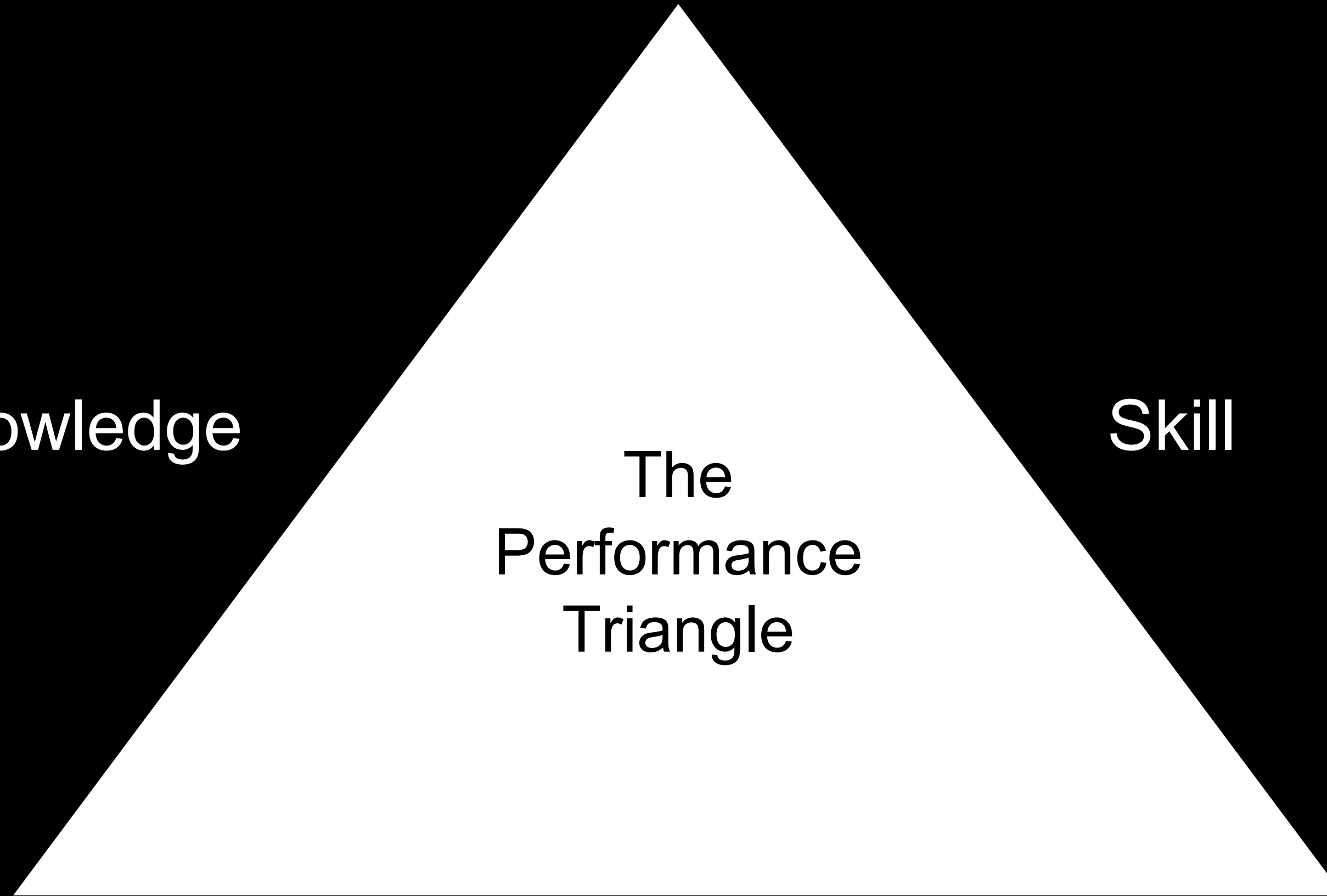


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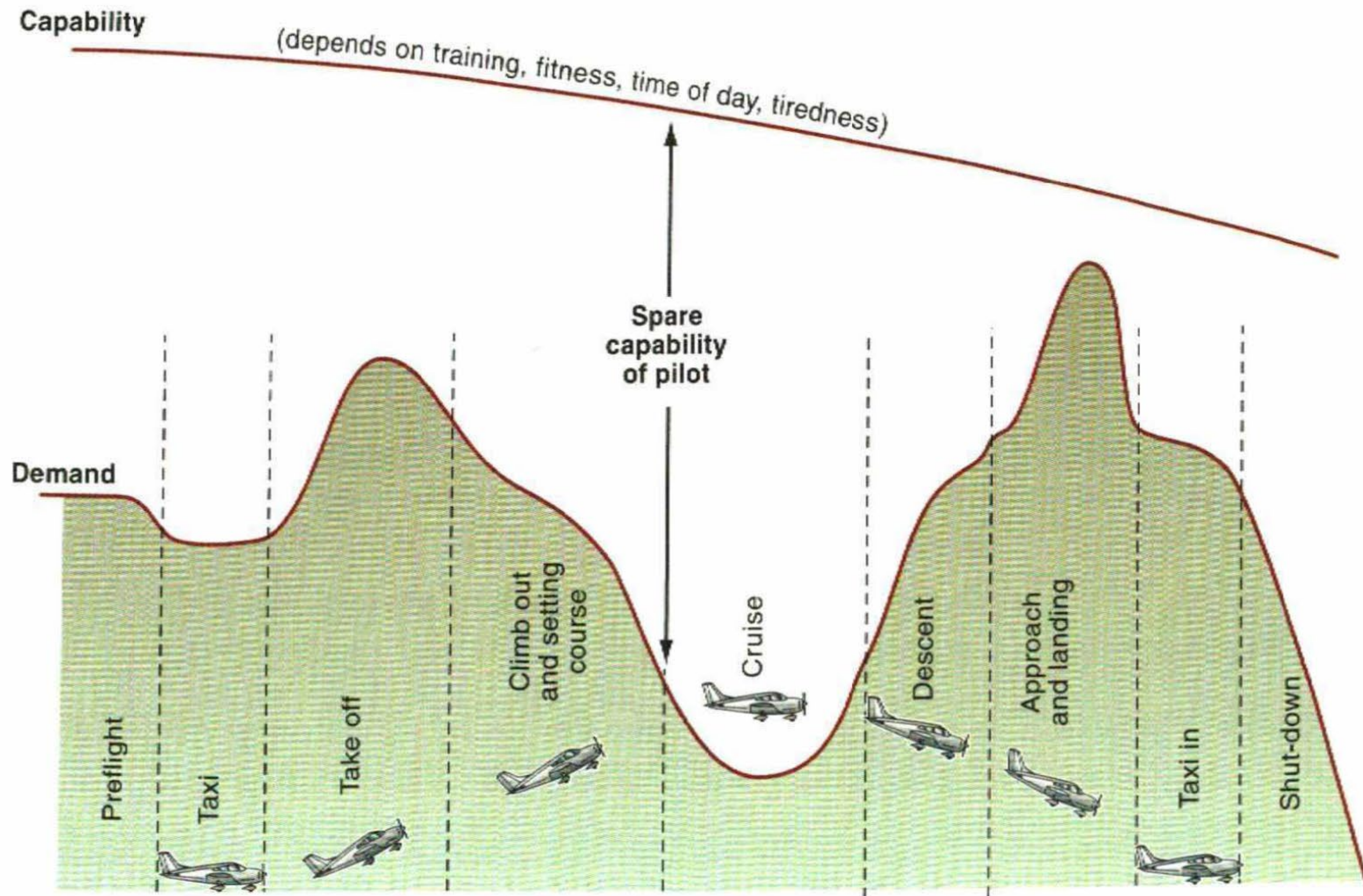




# Värt att fundera på

- Är det piloten, miljön, eller materialet som är den svagaste länken?
- Trafikvarv med lokala avvikelser...
- Flygplatser och flygfält...
- PPR...
- Stall...

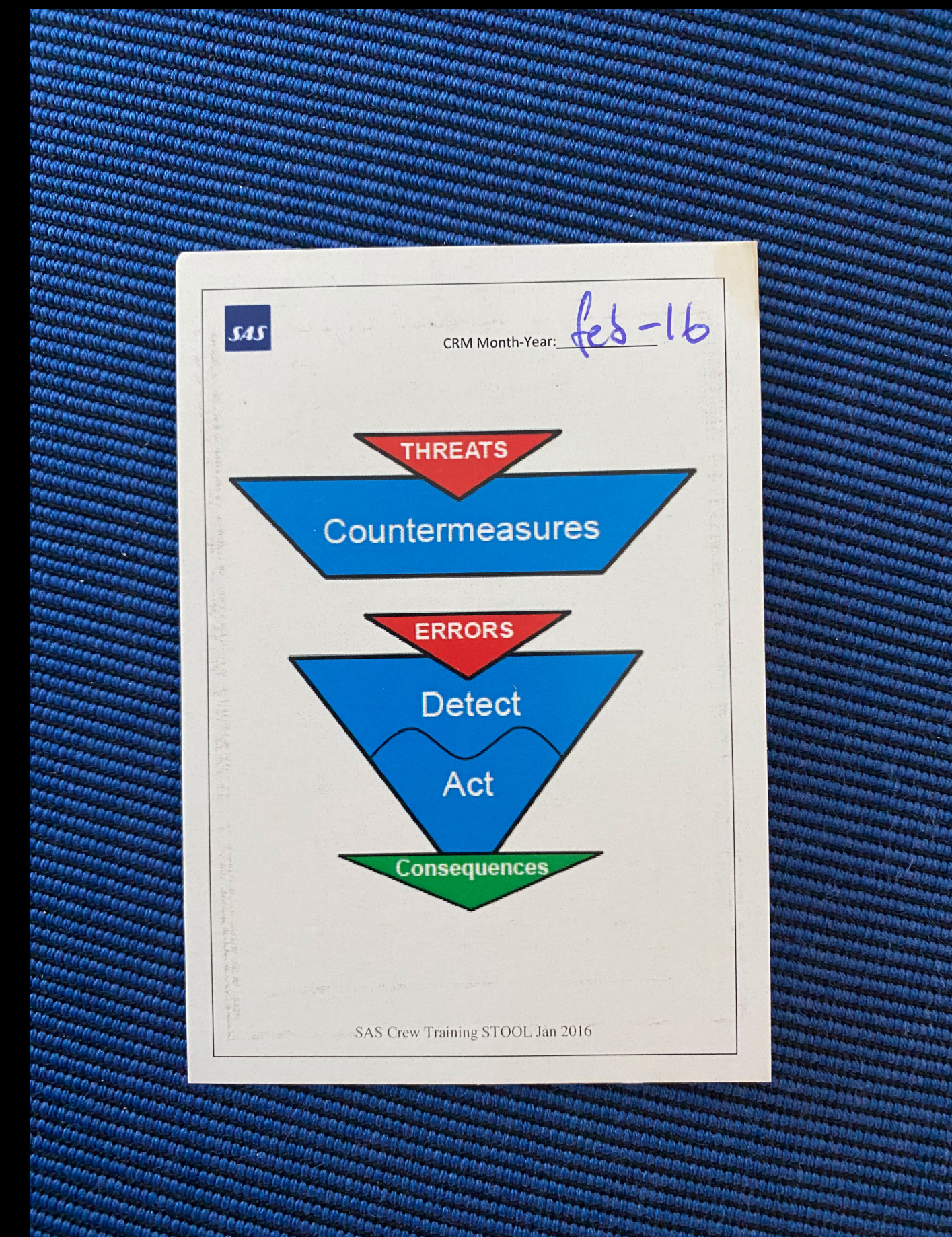
# Reservkapacitet





# Att göra!

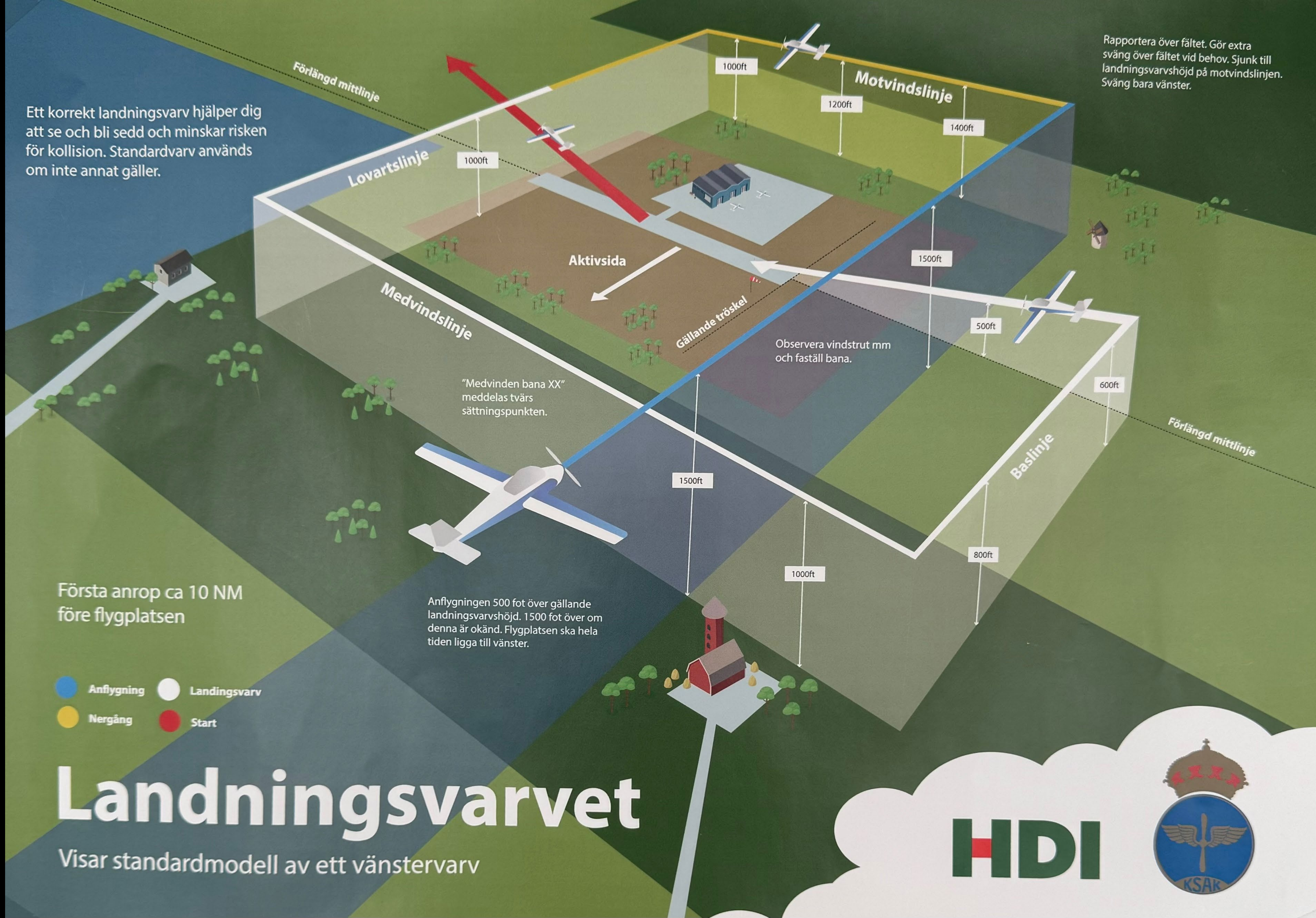
- Håll mittlinjen samt korrekt höjd/kurs/fart
- Trimma och slappna av - ryggstöd?
- Tänk efter före - TEM/Briefing/tänk högt
- Kunskap - POH/supplement/regler
- Landa på korta fält (aircraft handling)
- Cockpit routines - trigger/flow/checklist
- Stay visible/look out-peek in/radio com.





Ett korrekt landningsvarv hjälper dig att se och bli sedd och minskar risken för kollision. Standardvarv används om inte annat gäller.

Rapportera över fältet. Gör extra sväng över fältet vid behov. Sjunk till landningsvarvshöjd på motvindslinjen. Sväng bara vänster.



Första anrop ca 10 NM före flygplatsen

- Anflygning
- Landningsvarv
- Nergång
- Start

Anflygningen 500 fot över gällande landningsvarvshöjd. 1500 fot över om denna är okänd. Flygplatsen ska hela tiden ligga till vänster.

Observera vindstrut mm och faställ bana.

# Landningsvarvet

Visar standardmodell av ett vänstervarv

HDI





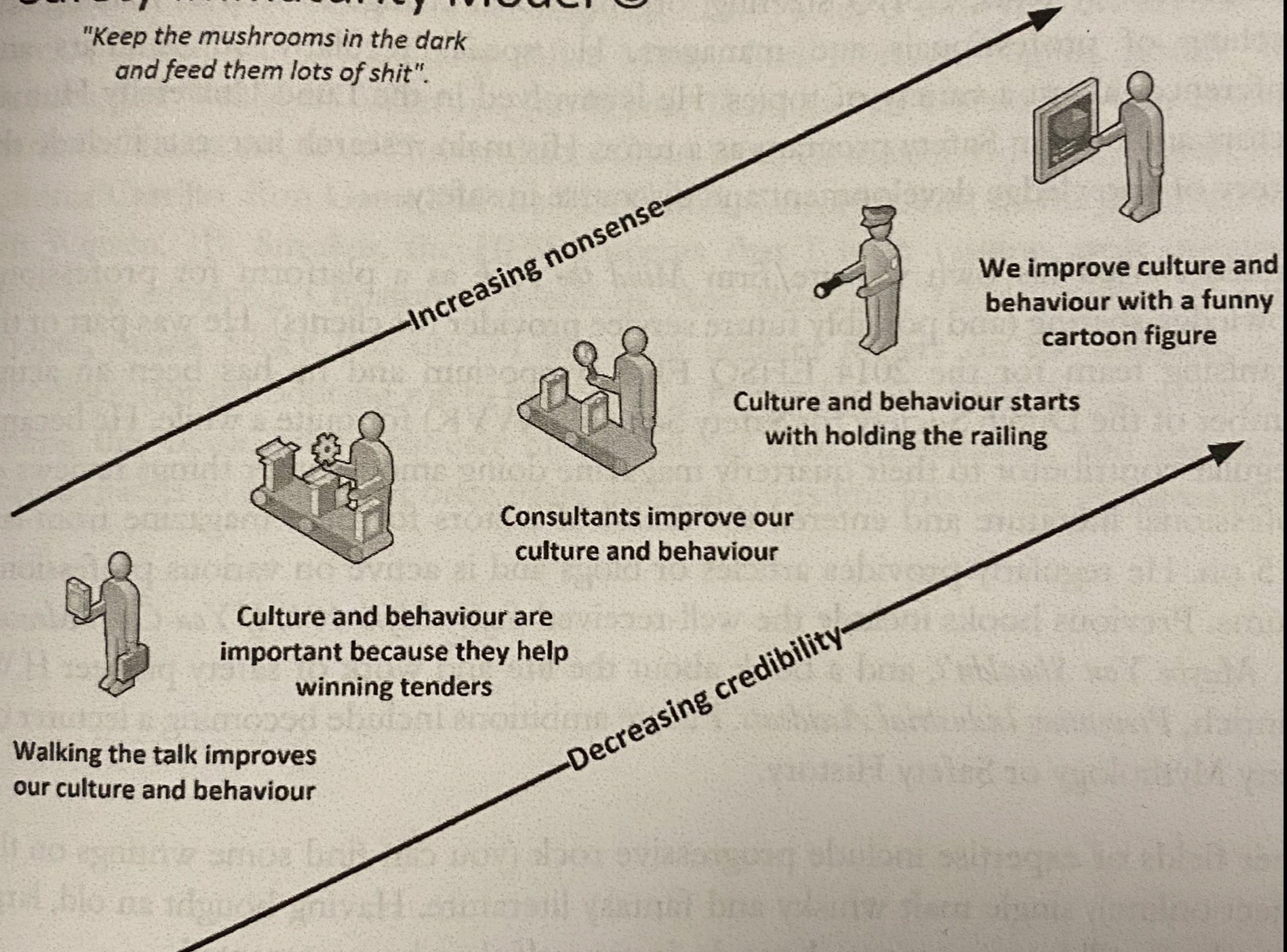
# Tänkvärt

- Det perfekta är det godas fiende
- Slö och slapp men inte likgiltig
- Prepared for the unexpected
- A plan is nothing - planning is everything
- Option generation - time critical or not
- If faced with an emergency landing, fly the thing as far as possible into the crash
- Heuristics - upptäcka, finna, hitta, se en lösning, tumregler, intuition



# Safety Immaturity Model ©

*"Keep the mushrooms in the dark  
and feed them lots of shit".*





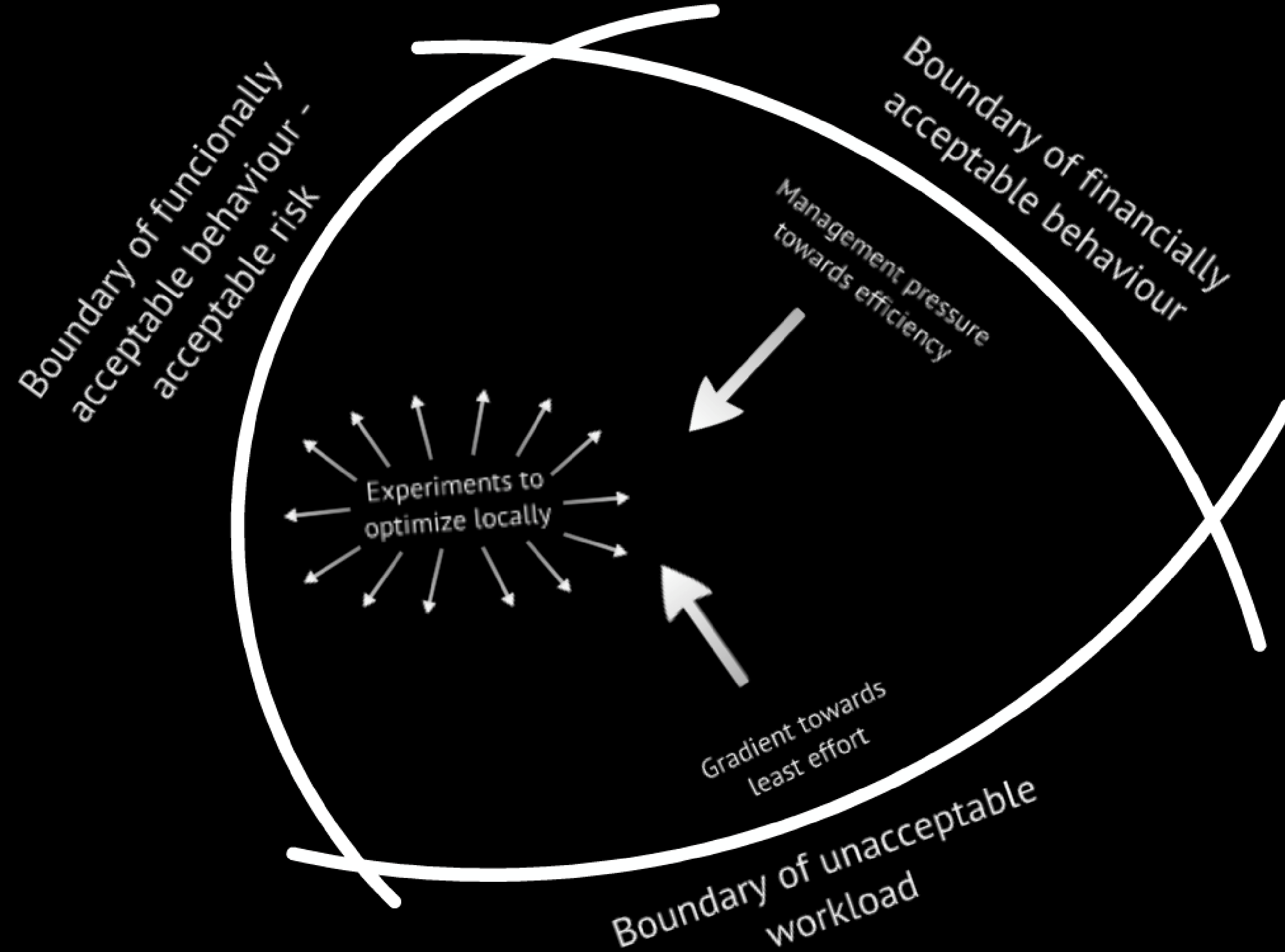
**Table 1** Disciplines frequently involved in Human Factors activities<sup>1</sup>

<b>Discipline</b>	<b>Definition</b>	<b>Specific area of interest</b>	<b>Typical area of application</b>
Psychology	The science of mind and behaviour.	Sensory characteristics, perceptual laws, learning principles, information processing, motivation, emotion, research methods, psychomotor skills, human errors.	Display requirements and design, control systems design, allocation of function, training system requirements and methods, selection methods, effects of emotional and environmental stress on performance, simulation requirements.
Engineering	Applying the properties of matter and the sources of energy in nature to the uses of man.	Hydraulics, mechanical, structural, electrical, electronic, and aerodynamics design, systems analysis, simulation, optics.	Design of displays, design of controls, design of control systems, design of complex systems, design of optical systems, simulator design.
Human physiology	Deals with the processes, activities and phenomena characteristic of living matter, particularly appropriate to healthy or normal functioning.	Cell structure and chemistry, organ structure and chemistry, interaction of the various body constituents to promote health and function, functions and requirements of body systems.	Environmental systems, diet and nutrition, effects of environmental factors (heat, cold, hypoxia), establishment of environmental requirements.
Medicine	The science and art of preventing, alleviating or curing disease and injuries.	Effects of various forces, radiation, chemical and disease agents; appropriate preventive methods of protecting health and well-being.	Toxicology of smoke, chemicals, impact protection, maintenance of health.
Sociology	The study of the development, structure and function of human groups	Small and large groups or "teams"; crew composition; behaviour of passengers in emergency situations.	Crew selection, passenger safety.
Anthropometry	Study of human body sizes and muscle strength.	Anatomy, biodynamics, kinesiology.	Ground support equipment, access door size for maintenance, work station layout (reach, range of adjustment of seats, etc.)

1. Other disciplines with representatives actively engaged in Human Factors activities include education, physics, biochemistry, mathematics, biology, industrial design and operations research.

# Jens Rasmussen

- Forskare på Risö I Danmark
- All decision are right when you take them
- Local rationality
- 1997 - Risk management in a dynamic society
- 2005 - Going solid
- Richard Cook - Resilience in Complex Adaptive Systems
- Scott A. Snook - Friendly Fire



Rasmussen, J. (1997). Risk management in a dynamic society: A modelling problem. *Safety Science*, 27(2-3), 183-213.

# Golden rules

## Taktisk nivå

- Fortsätt flyg!
- Safe trajectory
- Safe altitude
- Communicate



**GOLDEN RULES**  
FOR PILOTS

**AIRBUS**

- 1 **Fly, navigate and communicate:**  
in this order and with appropriate tasksharing
- 2 **Use the appropriate level of automation at all times**
- 3 **Understand the FMA at all times**
- 4 **Take action if things do not go as expected**

**AIRBUS**

The graphic features a blue-tinted background image of an airplane cockpit. The text is overlaid in white and yellow. The Airbus logo is visible in the bottom right corner of the graphic.



# Golden Rules

## Strategisk nivå

- GEPARD (Airbus)
- Var - Vad - Vart (LIN)
- Position 1 vs Position 2
- Don't be busy, don't be smart, always have a reason

### GEPARD - GET ORGANIZED

Deal with malfunctions and prepare for approach in an orderly fashion



#### 1. GOLDEN RULES

Remember the Airbus Golden Rules:

**Fly - Navigate - Communicate**

Phase of flight considerations:

T/O - MSA, EOSID?  
 Climb - MOCA/MORA?  
 Cruise - Driftdown, diversion?  
 Descent - Level off?  
 App/Ldg. - App capability, diversion?



**Fly** - Confirm PF?  
 - AP & A/THR ON/OFF?  
 - Flap config?  
 - Landing gear?

**Navigate** - Position?  
 - Clear of traffic?  
 - Above MSA  
 - Eng. Out SID?

**Communicate** - Keep ATC in the loop with a brief call

#### 2. ECAM

Strict ECAM discipline is essential.

Remember the task sharing between

PF & PM.

Thrust levers, MASTER switches and all guarded switches must be confirmed to be correct by both crewmembers before any action



PF calls "ECAM Action" and assumes communication

PM applies any relevant OEBs and then performs ECAM actions and/or appropriate QRH procedure:

- Action lines
- Secondary failures

Perform normal checklists and system resets and then:

- Status (STS)

#### 3. PROCEDURES

Locate procedures called for by ECAM in the QRH and apply them in a logical order. Make a note of procedures to be applied during a later stage (Deferred Procedures)



Procedures called by ECAM - Fuel, LDC apply, Summaries  
 Check performance in QRH - Fuel penalties, EO service ceiling

FlySmart LDC - Insert ECAM and WX/RCAM  
 - Check result against STS page

If the situation is critical the flight should not be prolonged only to consult FCOM

#### 4. Awareness?

Once the malfunction has been dealt with, it is important to ensure that PM & PF have a "Shared Situational AWARENESS" of the past, present and future. This also includes cabin crew, PAX and ATC briefings



PM reviews and briefs PF on - What happened  
 - How does it affect performance  
 - Status of QRH(Deferred)/FlySmart

PF reviews and briefs PM on - Position  
 - ATC clearance

Commander verifies:  
 - ATC informed  
 - Cabin crew informed (NITS)  
 - Passengers informed

#### 5. READY FOR APPROACH

Apply Airbus SDP when preparing for the approach.

During briefing include TEM with regard to the failure, approach environment and other challenges.



PF "Your controls" PM assumes control and communication

PF prepares the approach - Tophat (FRPPFS)  
 - Brief PM

PF "My controls" PM retains communication

Communicate your plan to ATC

#### 6. DEFERRED PROCEDURES

Re-consult the QRH for specific stage related procedures during the approach



PM reviews and reads any deferred QRH procedures

When selecting flaps 1 review then remove STS page