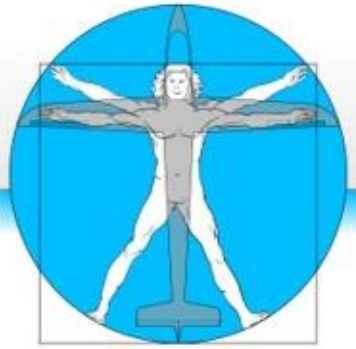


FLYTOP

FLY TOP - FLY SAFE!

Safety Improvements

for

Non-Commercial,
Non-Complex Organizations operating
Non-Complex aircraft
(NC^3-organizations)

FLYTOP

www.flytop.org

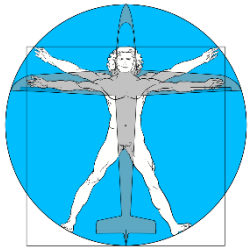
- Prof. Dr. Alfred Ultsch -

ultsch@ulweb.de

Tobias Kemmerer

- ***flying sailplanes since 2006***
- ***member of the Akaflieg Frankfurt***
  academical gliding club of Goethe University
  - *NOT building gliders*
  - *BUT soaring related research such as*
    - **mountain wave / thermals research**
    - **data gathering / sensor platform**
      [AFIIS – Akaflieg Frankfurt Inflight Information System]
      → (big) data science / swarm intelligence
    - **flight safety**
- ***engaged with FLYTOP since 2015***
- *background in IT & economics, happily married to Marina (biochemist / quality manager) and currently 0.8 children, …*

ultsch@ulweb.de



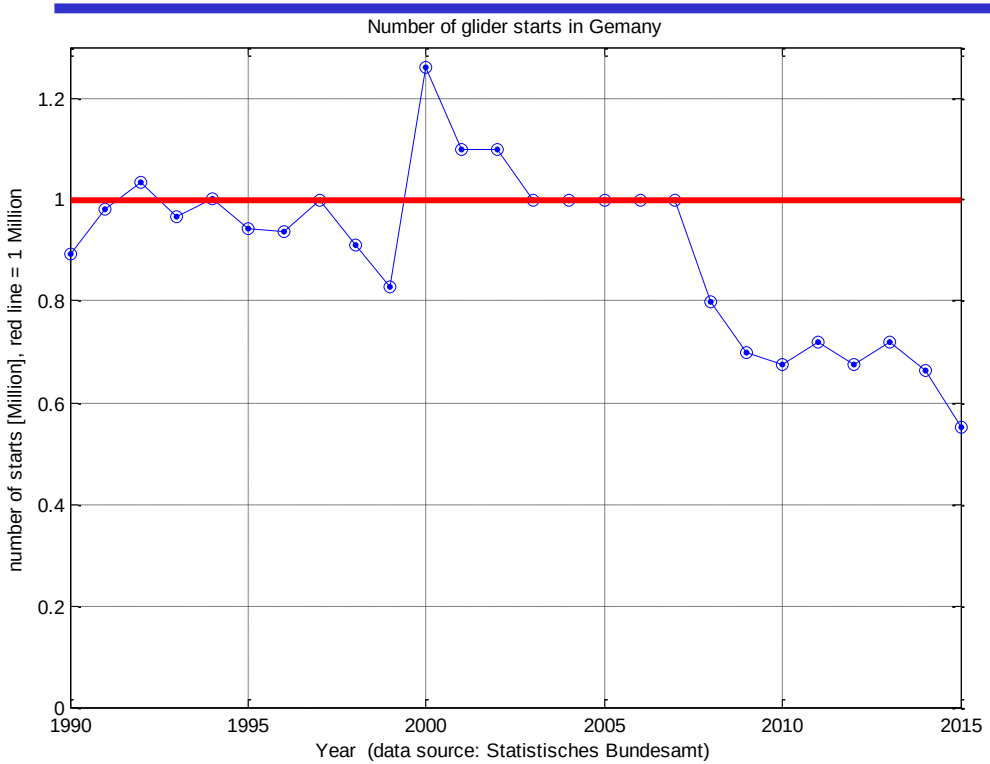
What are

- ***Non-Commercial, Non-Complex Organizations operating Non-Complex aircraft (NC^3-organizations)***

- ***EASA‘s (European Aviation Safety Agency) terminology for***

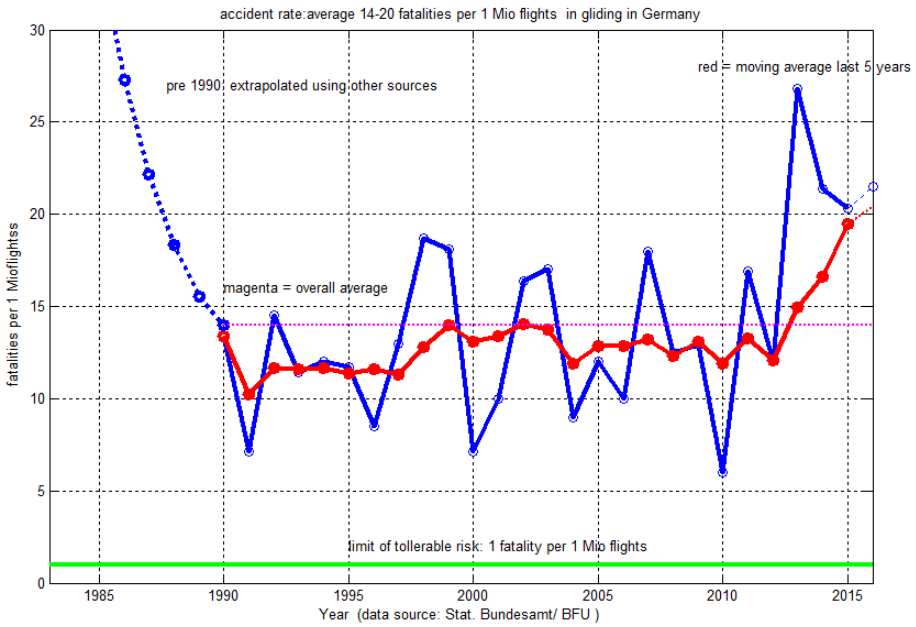
>> Gliding Clubs

The Situation in Germany

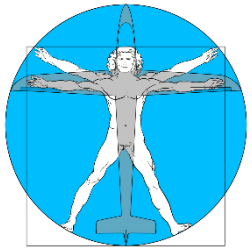


- **until 2007 ca. 1 million glider flights per year**
- **since 2008 ca. 700.000 glider flights per year**
- **eventual falling trend**
- **Data Sources: Statistisches Bundesamt, Jahresberichte,** Verkehr Luftverkehr auf allen Flugplätzen, Statistisches Bundesamt, Wiesbaden.
- Accident Data: Jahresberichte, Bundesanstalt für Flugunfalluntersuchungen (BFU)

Risk of Gliding in Germany

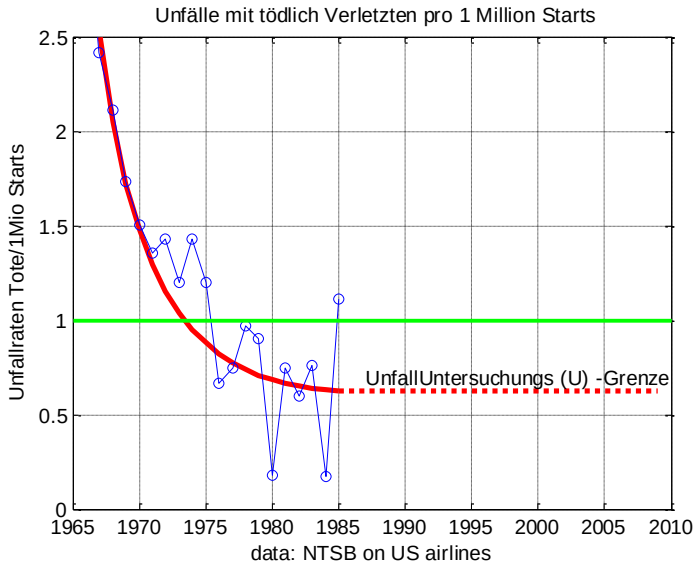


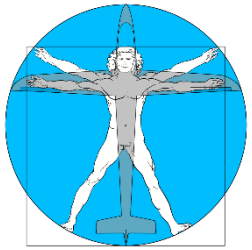
- **until ca 1990: dramatic reduction in risk due to improvements in safety**
- **since ca 1990: NO MORE REDUCTION of risk!**
- **Presently: 15-20 fatalities per 1 Mio flights**
- **eventually a trend for increased risk since 2011?**
- **risk 10 times to high!**
- **1 death per Mio flights would be acceptable**



How can this be explained?

- almost exclusively the safety measures that are applied in practice in Germany can be termed as:
- **Static Safety Measures (*reactive safety*)**
- It is known that all safety methods saturate after some time i.e.
- it takes an enormous effort to improve safety only a little bit using this method
- Example: risk in commercial flights (USA) up to the 1970s

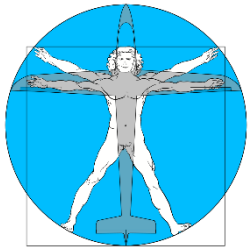




What are static safety measures?

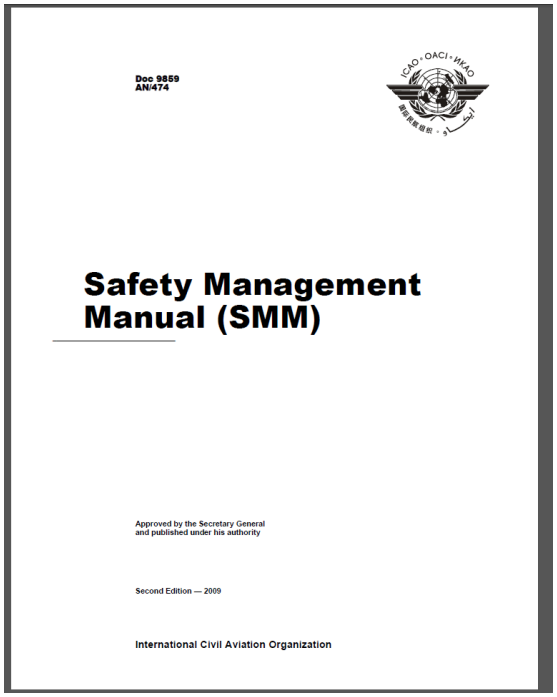
- good pilot training using
- „safe“ equipment
- „safe“ Standard Operation Procedures (SOPs) and
- accident preventing rules and regulations (Laws)

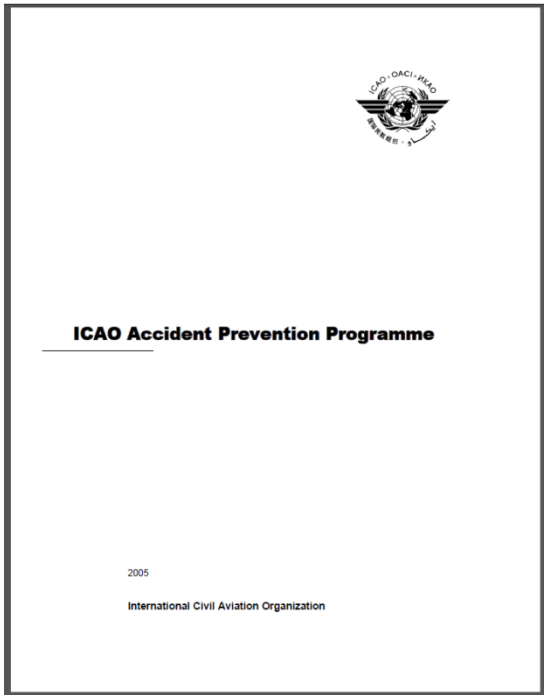
- The SOPs Rules and Laws are modified using
- intensive accident investigations by highly trained personal (Bundesamt für Flugunfall-Untersuchungen)
- => Changing of Rules slow but effective



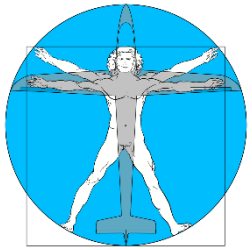
A word on notion

- the basic vocabulary in flight safety stems from ICAO, in particular:
- 1. Accident Prevention Programme (APP) (2009)
- 2. Safety Management Manual (SMM) (2013)





- modern regulations in flight safety, in particular EASA laws rely on these concepts.

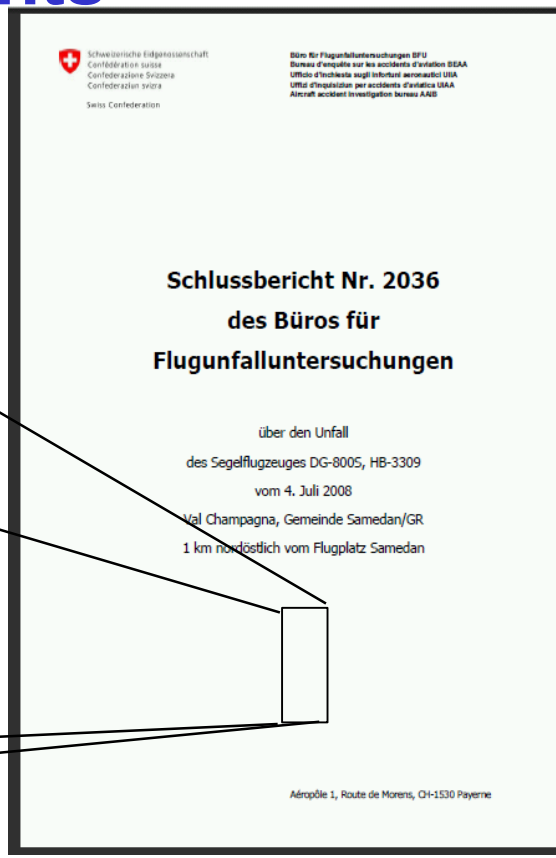


To many ...ive words

- **However, for the ordinary pilot there are to many „– *ive*“ words:**
  - preventive
  - active
  - proactive
  - reactive
  - predictive
  - passive
  - ...
- **For the most relevant concepts I am using:**
  - **static == reactive and**
  - **dynamic == proactive**

Static Method

Reactive = learning from accidents



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Büro für Flugunfalluntersuchungen BFU
Bureau d'enquête sur les accidents d'aviation BEAA
Ufficio d'inchiesta sugli infortuni aeronautici UIA
Uffizi d'inquisizion per accidents d'aviatica UIAA
Aircraft accident investigation bureau AAIB

Schlussbericht Nr. 2036
des Büros für
Flugunfalluntersuchungen

über den Unfall
des Segelflugzeuges DG-800S, HB-3309
vom 4. Juli 2008
Val Champagna, Gemeinde Samedan/GR
1 km nordöstlich vom Flugplatz Samedan

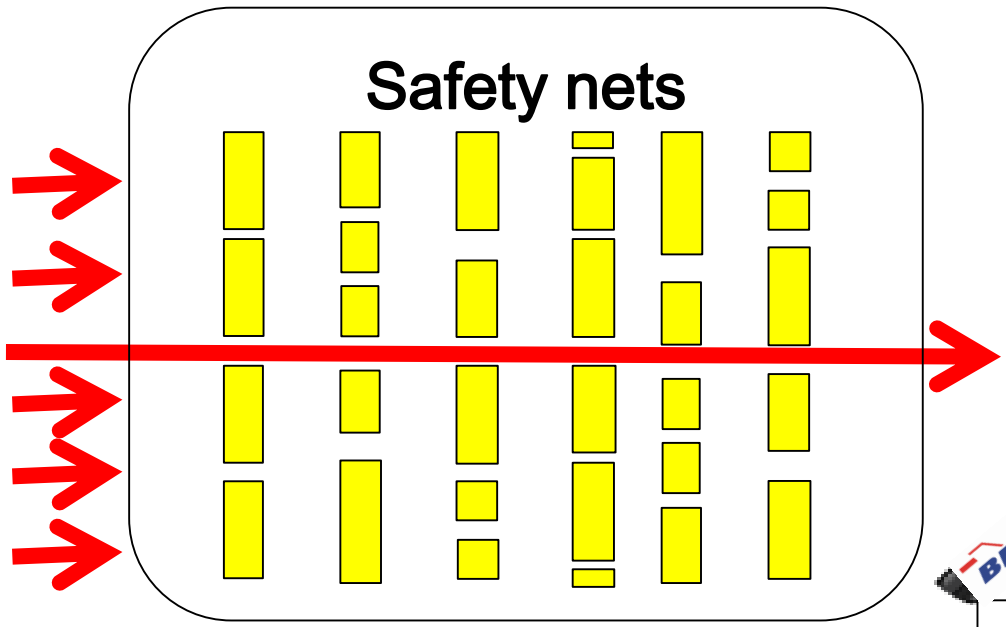
Aéropôle 1, Route de Morens, CH-1530 Payerne

aim: better rules / regulations / SOPs

good example: bonding defects of DUO aileron

Static Method for Safety

Threats



Accident

BFU

BFU

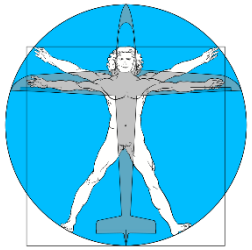
expert investigation

Measures:
Rules / Regulations,
SOP
Recomendations
Technical Notes

Authorities,
Manufactures, FAA,

Results

ultsch@ulweb.de



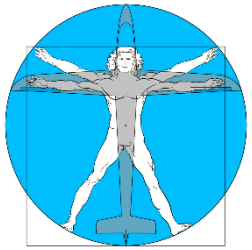
How come that this method is „saturated“

- **Conclusion 1: in Germany we do have a very effective system of rules, regulations and SOPs to prevent accidents**
  in particular:

- **Segelflug Betriebs Ordnung (SBO)**
  = Operations Manual for Gliding
- **Methodik der Segelflugausbildung**
  = Methods for Training in Glider Flying

- **Experts keeps these regulations up to date and changes it, when necessary (accident investigations)**

→ **Thank You: Bundeskommsion Segelflug!**



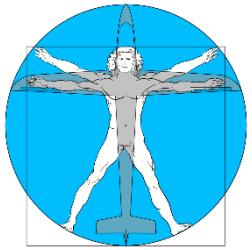
How come that this method is „saturated“

- **Conclusion 2: Technical issues (defects in the glider) and weather issues are less important in accident production than the „Human Factor“**

- **A first approach to address these issues were the subjects: „human factor and limitations“ and „coping special cases“ as part of the theoretical training of glider pilots**

- **However:**
- **Conclusion 3: Human factor causes of accidents are very individual for each accident so that no „general rule“ or „general recommendation“ or „changing of rules“ can be concluded from these accidents**

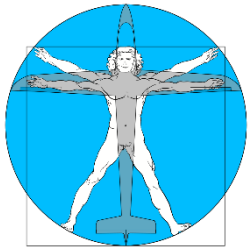
=> Static methods are in saturation!



The Bitter Lesson

- **The safety method which is almost uniquely up to present (static) iseffective,**
- **HOWEVER: It can hardly be expected these methods can be used for further reduction of the risks**
- **So the intensive investigation of singular accidents will not improve safety in gliding substantially**

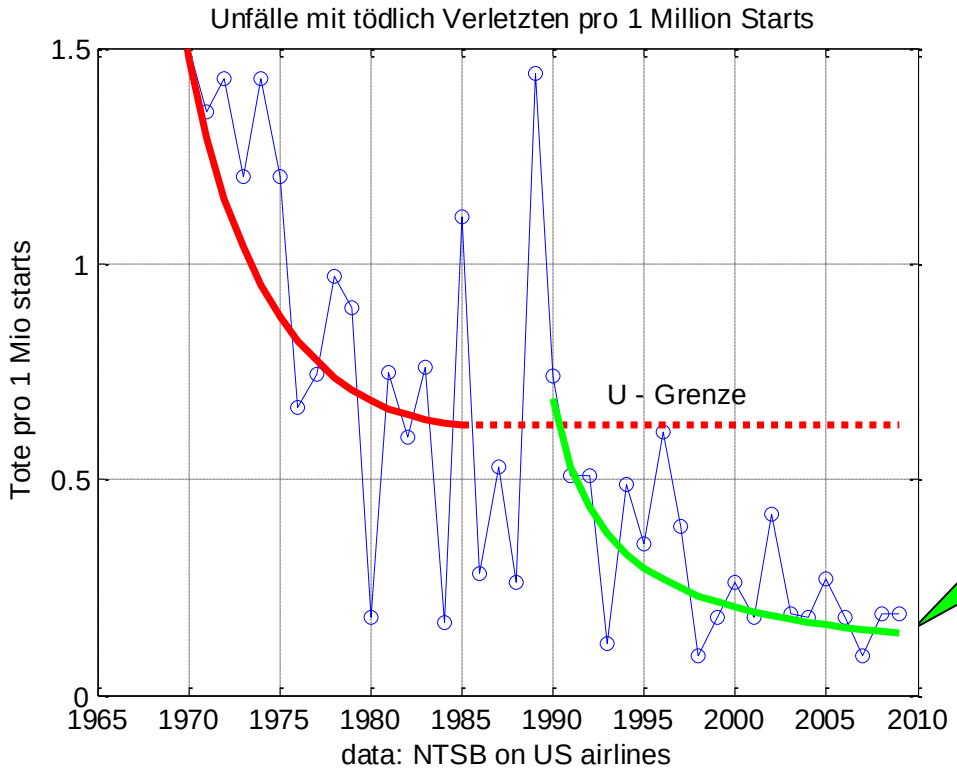
→ more rules will NOT improve safety!



However there is Hope

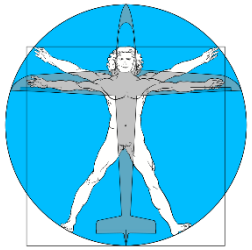
1. **Gliding is not the first branch of aviation that experiences this saturation effect**
2. **The main idea is to apply a new approach of safety to glider flying**
3. **These methods have been shown to be effective in commercial aviation** ***(see next slide)***

static plus dynamic
Methods of safety



Improvement factor: ca. 10

- **fatality risk in commericial airlines (USA)**
- **implementation of dynamic safety methods starting ca 1990**



How did the Airlines do that?

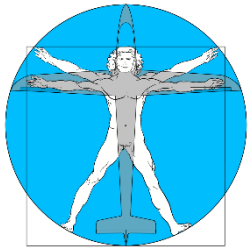
- ground breaking NASA seminar
- Universities
- Psychology Departments
- Complex Systems Theory

development and implementation of:

- CRM, LOFT,
- today: NOTECH- Skills –Training
- HFACS
- Thread and Error Management (TEM)

consequence:

- differentiation of von **2 types of flight safety:**



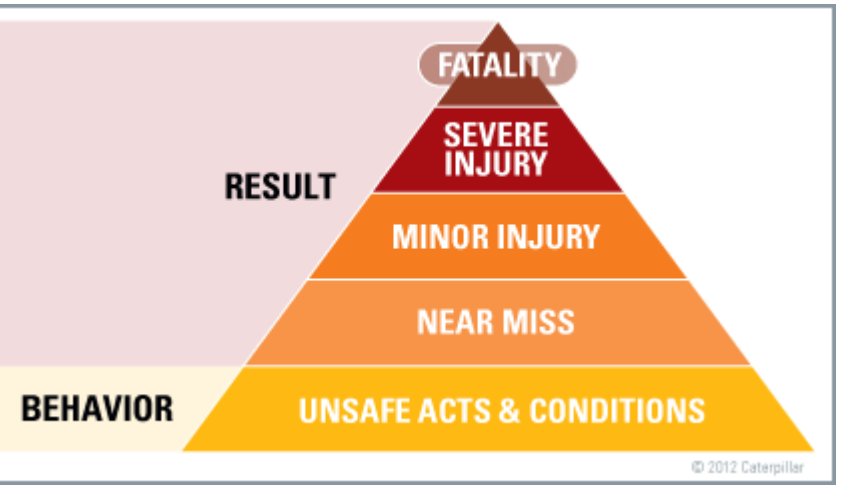
Methods for accident prevention

- **2 different types:**

Dynamic safety

Static safety

Core Ideas of Dynamic Flight Safety:

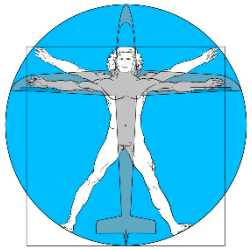


- **pilots are not alone: they are embedded in a social system**
- **in gliding: *their club***
- **accidents are just the tip of the iceberg**

⇒learn from unsafe acts

⇒improve the safety of the club

⇒teach the club not the pilot

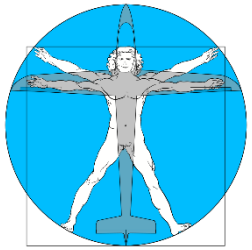


So main Method is

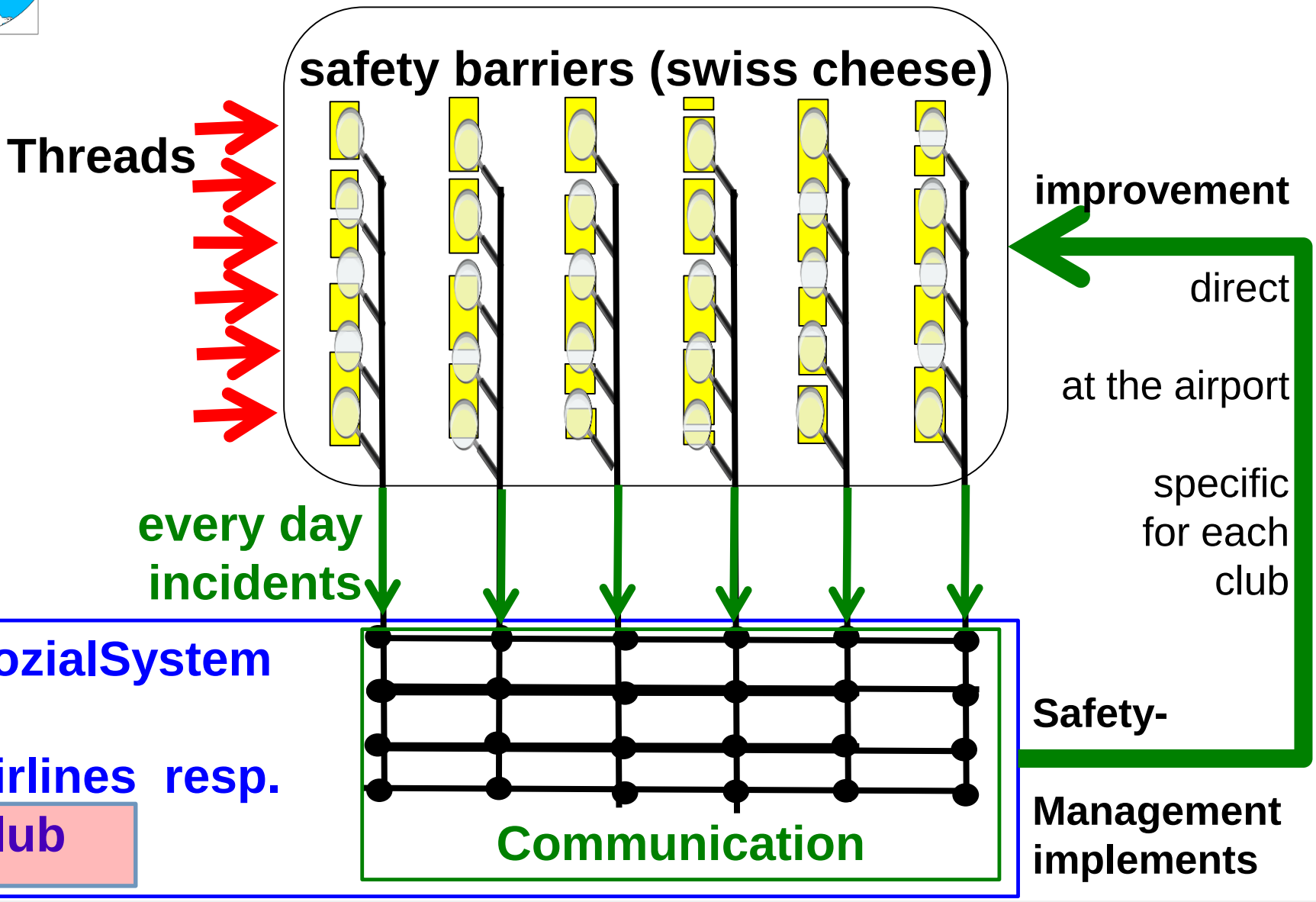
- **Teach the club safer flying**
- **Is this possible? Yes,**
- **it is even easier to change the safety level of a club than that of a single pilot**

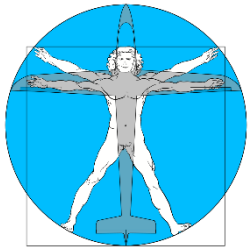
- **what are time & money expenditures? (see next slides)**

- **Can anyone do that: NO (don‘t try this at home!, NEVER TRY THIS WITH YOU OWN CLUB!)**



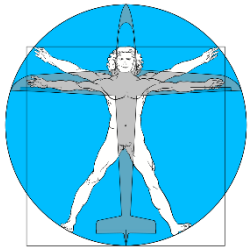
DYNAMIC Method





Who do we need to teach?

- the club‘s leaders i.e. the officers, flight instructors, opinion leaders (leaders)
- the club as a whole (Club)
- the social environemt of the pilots: wives, partners, parents (partners)
  (these act also as controllers)



FLYTOP Trainings

- **Club Training**

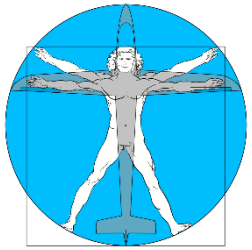
Leaders 1.5 days	**Club Training 2 days**	Refresher 1 day

- **Flight Instructor Training**

Teaching Flight Safety 2 days	Clinic for Flight Safety 1 day

- **FLYTOP-Trainer Training**

Module1	Module2	Module3



The FLYTOP Method

- **precursors: Stop Crashing / Fly Safe (Sweden)**
-

FLYTOP leaders 1.5 Days

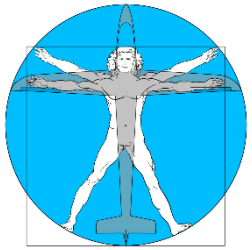
FLYTOP Club 2 days

FLYTOP flight instructors 2.5 Days

...

FLYTOP refresher 1 day

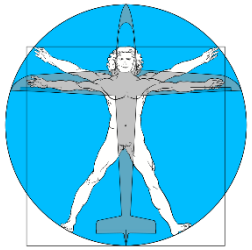
- **Required audience:**
- **leader course: 98+% of leaders**
- **club courses 80+% of members plus wifes / partners / parents**



Syllabus of the Club Curse

- modern safety methods
- assessing the club's safety level
- methods for improvements

  >> COMMUNICATION
- in particular:
- the partners are taught the particularities of pilot's communication and pilot's behaviour traits
- Results after 2 days: 6-10 concrete projects including: chief, time line and controller

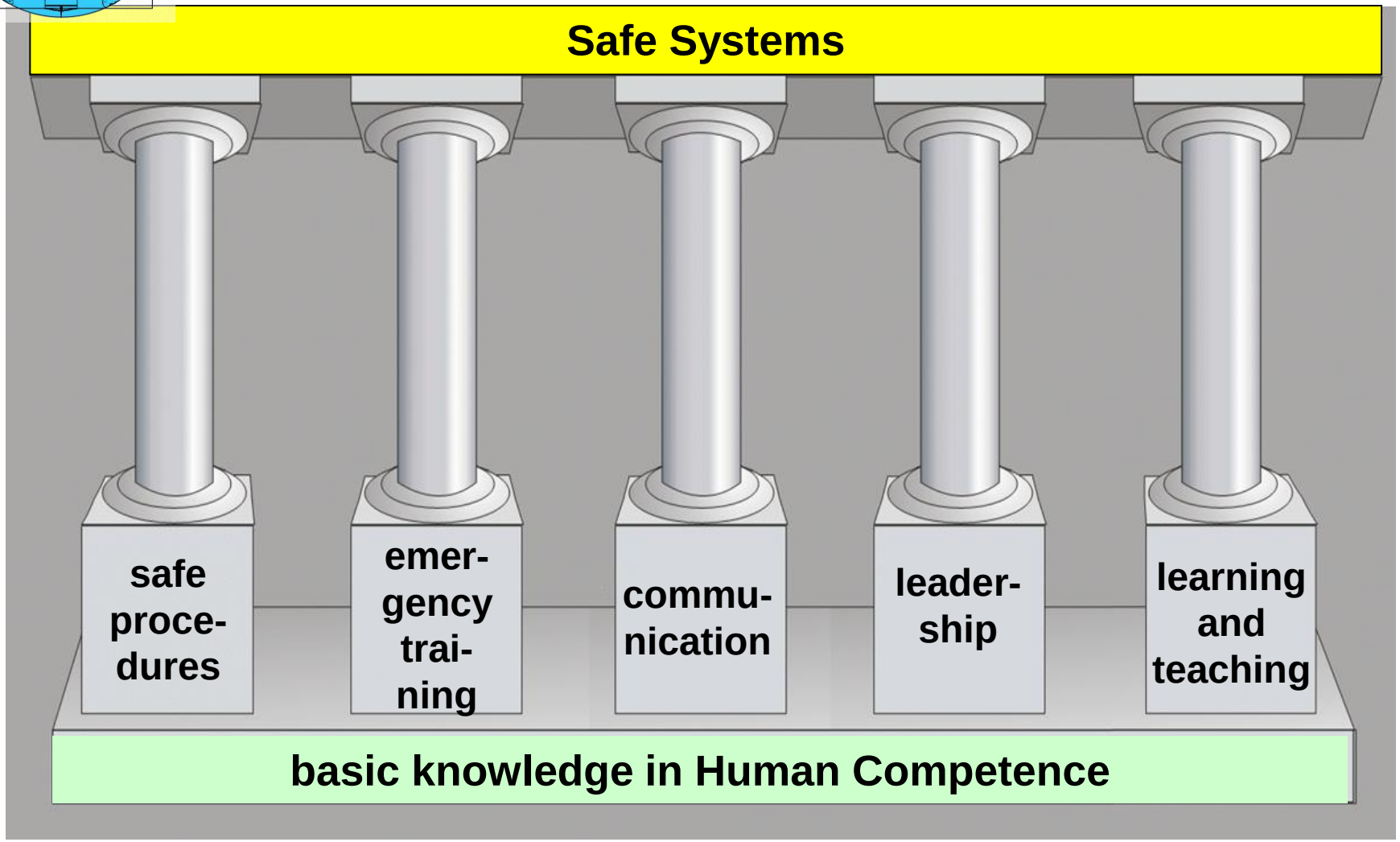


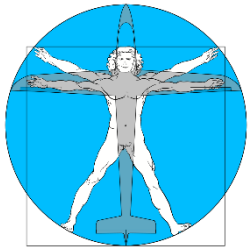
Syllabus of the Leader‘s Curse

- modern safety methods
- how are safety cultures recognized and
- methods for improvements

- COMMUNICATION for leaders

Syllabus of the Instructor‘s Curse

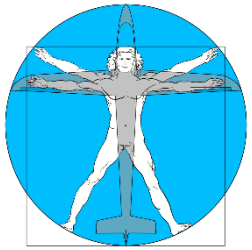




Again:

- **DON'T try this at home!**
- **amateur attempts in changing a club's „culture" will almost surely fail (we had our experiences!)**
- **DO NOT TRY TO TEACH YOUR OWN CLUB!**

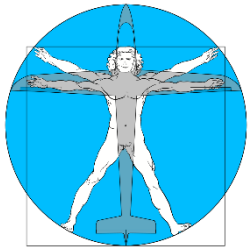
- **It takes some training and experience to successfully change a club's safety behavior!**
- **Trainers must be trained first!**



Can You adapt this System?

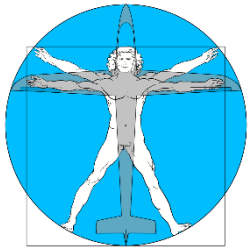
- Yes!
- Methods, systems and courses are developed and held on a non profit base
- fees are charged for travel expenses + reimbursement for trainers,
- often sponsored by insurances or the local gliding associations (LVB, HLV, BWLV...

- new trainees are welcome!



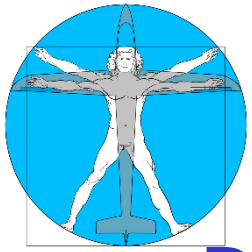
Application

- **ca 50+ courses in Germany and Switzerland**
- **according to a high FAA officer in Switzerland: „*more than 10 serious accidents prevented*“**
- **Next course: November 2017 in Bavaria**



Summary

- today's main safety method (static) is saturated
- to increase safety in gliding a new method, dynamic safety, must be implemented
- dynamic safety teaches the club instead of the pilot
- methods and courses are ready and developed
- OSTIV-TSP could help in the introduction of these new methods



Proposal for OSTIV/TSP

- **Development of a Manual:**
- **Modern Flight Safety for Gliding**

with an emphasis on dynamic methods

- **i.e. adopt for gliding:**
- **TEM (Thread and Error Management)**
- **HFACS (Human Factors Analysis and Classification System)**
- **CRM (Crew Resource Management)**
- **LOFT (Line Oriented Flight Training)**
- **and in particular:**
- **ICAO‘s Accident Prevention Programme (APP) (2009)**
- **ICAO‘s Safety Management Manual (SMM) (3. Aufl. 2013)**