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**IRSC**

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Aula der Wissenschaften

# **Train – meets – Plane**

Zug – trifft – Flug

**How aviation training concepts contribute  
to new safety levels in rail operation**

Dr. Peter Woditschka



# Dipl.-Ing. Dr. Peter Woditschka

## Short introduction

Electrical Engineering

Research and Development

„Safety System for high speed train boogies“  
(for ICE train, Siemens SGP)

„Development of high power PMSM motors and  
generators, e.g. for hydropower“  
(ELIN Motoren GmbH)

Strategy Consulting

Focus Automobile, Air/Space, High Tech Industry  
(formerly McKinsey & currently self-employed)

Aviation

„Pilot / Management“-combination, e.g. Head of  
flight ops controlling, evaluating investments in  
training and safety (Austrian Airlines)

Engineering  
Rail

Pilot +  
Management  
Aviation



# Potential dangers in spaceflight....

What do you think are the top 2 problems that create dangerous situations in spaceflight?

Here is what Spaceshuttle Astronaut Gerhard Thiele said:

1. The Astronauts are **NOT** adhering to the rules
2. The Astronauts **ARE** adhering to the rules



Space Shuttle  
Endeavour on  
Mission STS-99



# Application of rules develop over time...

How would YOU apply rules?

## Rules 1.0

„Here are the rules.  
**Strictly ADHERE** to them.“



## Rules 2.0

„Here are the rules,  
**ADHERE** to them and  
give us **FEEDBACK** if  
some rules seem  
inadequate.“



## Rules 3.0

„Here are the rules,  
**adhere** to them  
**UNLESS** adherence  
would contradict a  
higher good.“



# „Classical sanctioning“ fails at Rules 3.0!

How would YOU apply rules?

**Rules 1.0**  
(strict adherence)

**Non-adherence =  
sanctioned**



**Rules 2.0**  
(adherence &  
feedback)

**Non-adherence =  
sanctioned**



**Rules 3.0**  
(adhere unless)

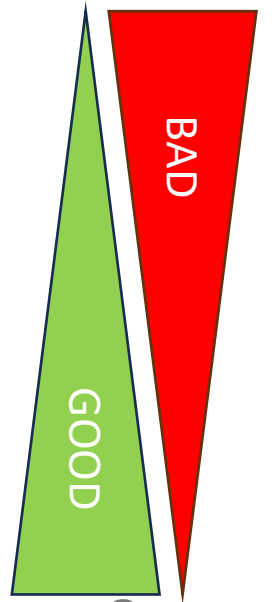
**Non-adherence:  
Sanctions MUST  
depend on  
circumstances**



# Better & worse reasons for non-adherence

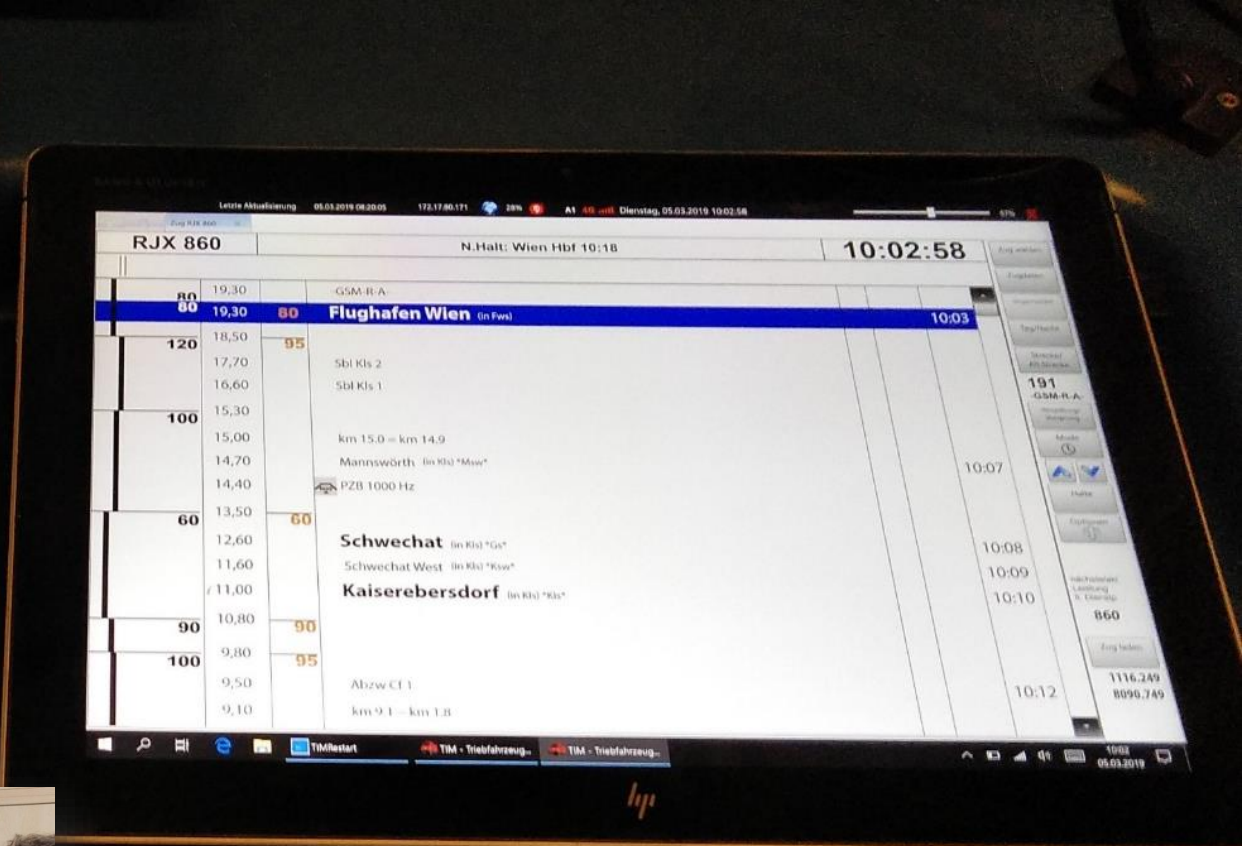
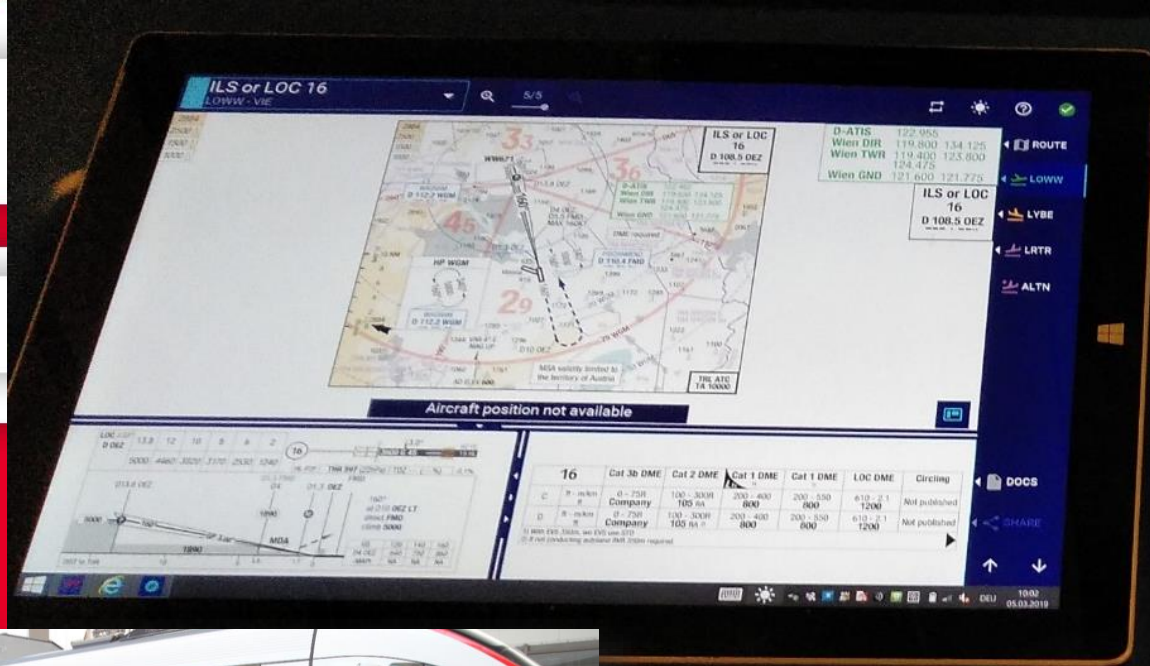
What would you see as a good reason to violate a rule?

1. **Intentionally** because of lazyness/comfort/preference/...
2. By **mistake**
  - a) Gross negligence
  - b) Slight negligence
3. Intentionally to preserve a **higher good**
  - Difficulty: how to deal with **good intention** / **bad outcome**?
  - **Culture** of cooperation / trust / common „safety-understanding“ / collaborative learning



# Train-meets-plane in practise....

## „TIM“ vs. „EFB“



# Let's see how we do it....



# Two primary target groups for „Train-meets-Plane“

## 1. SYSTEM ARCHITECT

- Target group  
Managers
- Key question  
How do I **design my system** to  
get the safest possible operation?

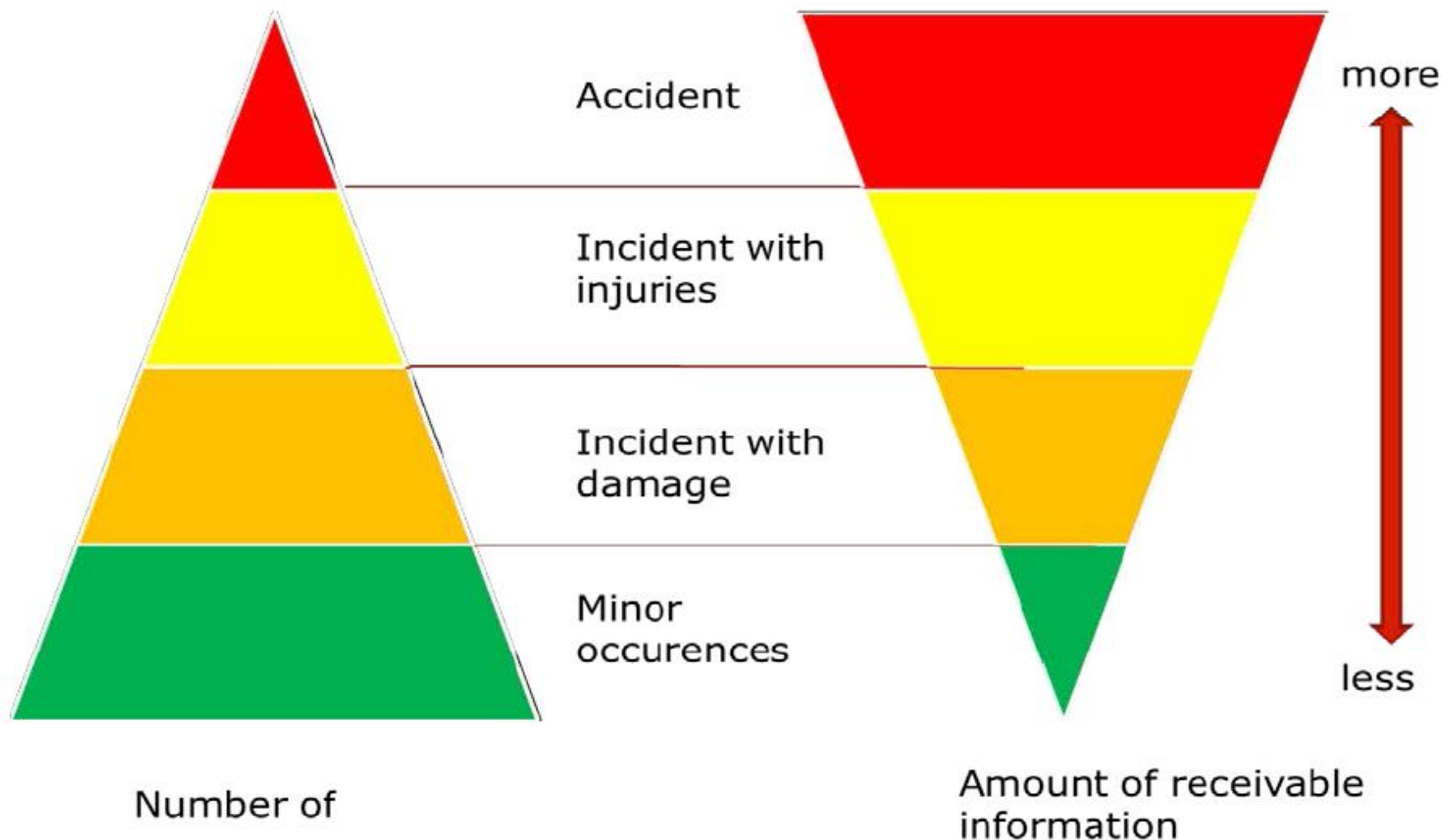
Flight Data  
Monitoring &  
Reporting

## 2. SYSTEM OPERATOR

- Target group  
Front end operators (e.g. train drivers/pilots,...)  
& their trainers
- Key questions  
How do I **drive my train**/fly my plane and  
which „tips & tricks“ help me to that the best way?

Rituals

# „That was just a very little flaw....“



Information about little flaws makes a big difference!

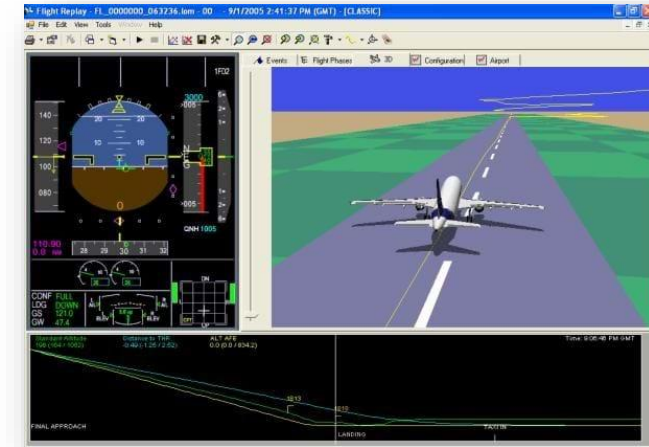
Main questions:

- 1.) How can you collect that information?
- 2.) How can you avoid a „drift up“ into more harmful regions?

# Combination of two elements works nicely in aviation

## 1. Flight Data Monitoring

- Continuous tracking of flight parameters
- Main focus: identify trends (risk index,...)
- Nevertheless: also individual crews can be approached for clarification of incidents
- BUT: this is done by a safety-department, NOT by the direct superior



## 2. Reports

- „non punitive system“ shall motivate
- Exemption: gross negligence / intention
- Not limited anymore to „pilots only“, also cabin crew, technicians and even admin/management personell

# A Ritual should prevent „ISD’s“?

Opening a normal aircraft door can really go wrong....  
What helps against „inadvertent slide deployments“?

Just ME and  
the SIGNAL

- **Technical warnings:** warning light in cockpit and in the door
- **Rituals**
  - S top → „Just ME and the DOOR“
  - C heck → Slide selector correct AND hand on correct lever?
  - O perate → „two finger-trick“
    - Use two fingers only to „disarm“ the slide and the full hand for the door – the **door handle would twist**
    - Always pull the door handle 1 cm, then stop a second and check the **warning light is out**



# Conclusion:

Reliable technology is the basis. Warning systems the gold-standard. But in addition to that you ALSO need

Rituals, Culture and Psychology



Openly dealing with mistakes

In order step to the next level of safety in rail operation!



# Thank you for your attention!



Dr. Peter Woditschka  
+43 650-7340310  
[peter.woditschka@gmx.at](mailto:peter.woditschka@gmx.at)

Connect via LinkedIn

