

Integrating SE into Industry

CC Mechanical Systems

Dr. Gerhard Stefan Székely
Lecturer Mechanical Engineering / Product Development
(previously: RUAG Space, Zürich)
T direct +41 41 349 32 42
gerhardstefan.szekely@hslu.ch

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FH Zentralschweiz



Hochschule Luzern
Engineering and Architecture

Introduction

Pure Mechanical Engineering → Multi Discipline

Optimisation of Production Lines

Decreasing Time to Market

More customer & regulation demands

Systems Engineering became necessary

Spreading to smaller Industry?

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Slide 3, 31/08/2015

Why?

"We are too small to employ a full time Systems Engineer ..."

CORRECT, ...

"A System Engineer is just another layer in the hierarchy that customers do not pay"

... BUT WE ARE TALKING ABOUT SYSTEMS ENGINEERING AS A COMPETENCE!

Compliance & interface doc?
Work with many disciplines?
Distributed teams?
Complex product?
Concurrent Engineering?

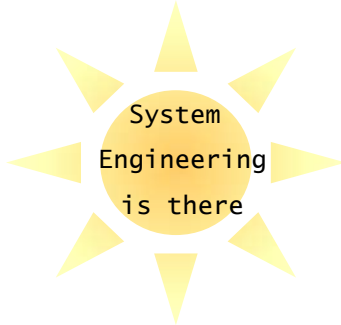
Yes?

System Engineering is there

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Why NOT?

TALKING ABOUT SYSTEMS ENGINEERING AS A COMPETENCE

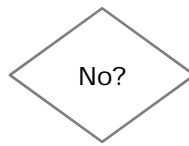


... but ...

... sufficient time allocated?

... known power of methods?

... layouts & tools?



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When?

Signs of urgency:

- Complexity?
- interface issues?
- misunderstood or overlooked requirements?

Decision & commitment:

- Yes, we do it!
- Yes, we invest time / money!

Action:

- Work out how and start



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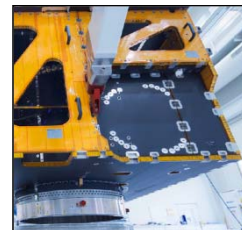
How?

1. What to improve?
2. Get knowledge
3. Try
4. Refine
5. Roll-out

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How? – Example 1: Compliance & Verification matrix

- Status ~ 2000: individual Excel & Word
- Target: Common method & tools
- Today implemented:
 - "Simpler" Projects: Excel-based common tool
 - Complex projects: DOORS



Together
ahead. **RUAG**

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How? – Example 2: System Engineering Education



- Status ~ 2000:

- SE in specific fields
- unclear
 - Education
 - Responsibilities
- varying views

- 2003+ First SE courses:

- SE basics
- too little reference to everyday work

- 2012+:

- Course System, with exams
- Foster common language, methods, tools
- Networking over BU's & countries

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How? – Example 3: Concurrent Engineering

- Status ~ 2012:

- First attempts with common Excel-tool ... too complicated

- 2013+ Setup of Room & "Process":

- Room:

- simple Notebook usage
- CAD/CAE stations
- Second beamer for protokoll

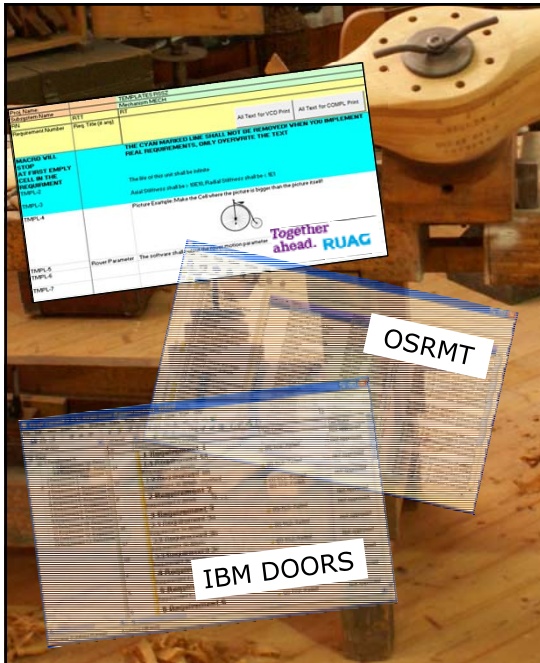
- Process:

- Simple
- Moderated



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Tools?

YES, but...

- Tool ≠ Solution!
- Features must be known!
- Methods more important!

Example Req. Management:

Word Matrix:

→ OK, if low Nr. Of Rqs., seldom usage

Self made Excel tool:

→ OK if not much break-down & interlinkage needed

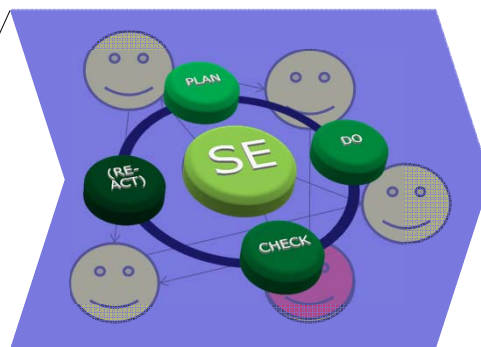
RM Software:

→ "Upper class"

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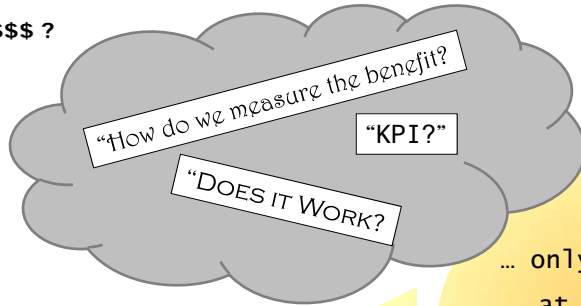
Processes?

- AS / EN / ISO require process descriptions, but:
- You can keep it very simple and still correct!



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\$\$\$?



... only indirectly
at Key Gates:

- Less issues
- Better collaboration
- better profit

*“If you do right, nobody will
notice, if you do wrong,
nobody forgets”*

(unknown)

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Summary

2. **When?**
As soon as you
notice need

3. **How?**
Step-by-Step

6. **\$\$\$?**
Finance: What if we
invest in our people
and they leave?

Chief: What if we
don't and they
stay?

1. **Why?**
Complexity,
disciplins, teams,
requirements

4. **Tools?**
Yes, but do not
overestimate
them

5. **Processes?**
Yes, but keep them
simple

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