

**How much time does
a team of Systems Engineers
need to phrase an I-message?**

Dr. David Endler, SWISSED 2025

Systems Engineers Love Numbers

122.000.000.000€

Agenda

- Systems Engineering Principles
- Soft Skills
- Key Take Aways

INCOSE's 15 Systems Engineering Principles

1. SE in application is specific to stakeholder needs, solution space, resulting system solution(s), and context throughout the system life cycle.
2. SE has a holistic system view that includes the system elements and the interactions amongst themselves, the enabling systems, and the system environment.
3. SE influences and is influenced by internal and external resources, and PESTEL factors.
4. Both policy and law must be properly understood to not over-constrain or under-constrain the system implementation.
5. The real system is the perfect representation of the system.
6. A focus of SE is a progressively deeper understanding of the interactions, sensitivities, and behaviors of the system, stakeholder needs, and its operational environment.
7. Stakeholder needs can change and must be accounted for over the system life cycle.
8. SE addresses stakeholder needs, taking into consideration budget, schedule, and technical needs, along with other expectations and constraints.
9. SE decisions are made under uncertainty accounting for risk.
10. Decision quality depends on knowledge of the system, enabling system(s), and interoperating system(s) present in the decision making process.
11. SE spans the entire system life cycle.
12. Complex systems are engineered by complex organizations.
13. SE integrates engineering and scientific disciplines in an effective manner.
14. SE is responsible for managing the discipline interactions within the organization.
15. SE is based on a middle range set of theories.

Source: <https://portal.incose.org/commerce/store?productId=commerce-merchandise%23INCOSE-SEPRINCIPLE>

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What is a Systems Engineer?

- Four key aspects of a successful lead Systems Engineer
 - Appropriate soft skills (general cognitive characteristics, abilities, behavioral competencies) and a disposition to systems thinking
 - Knowledge of the discipline of systems engineering and the ability to wisely apply the correct SE methodology/tools at the correct time
 - Knowledge of the domain (automotive, biomedical, energy, infrastructure, mil/aero, etc.)
 - Knowledge of the organization (decision making, funding, structure, culture, etc.)



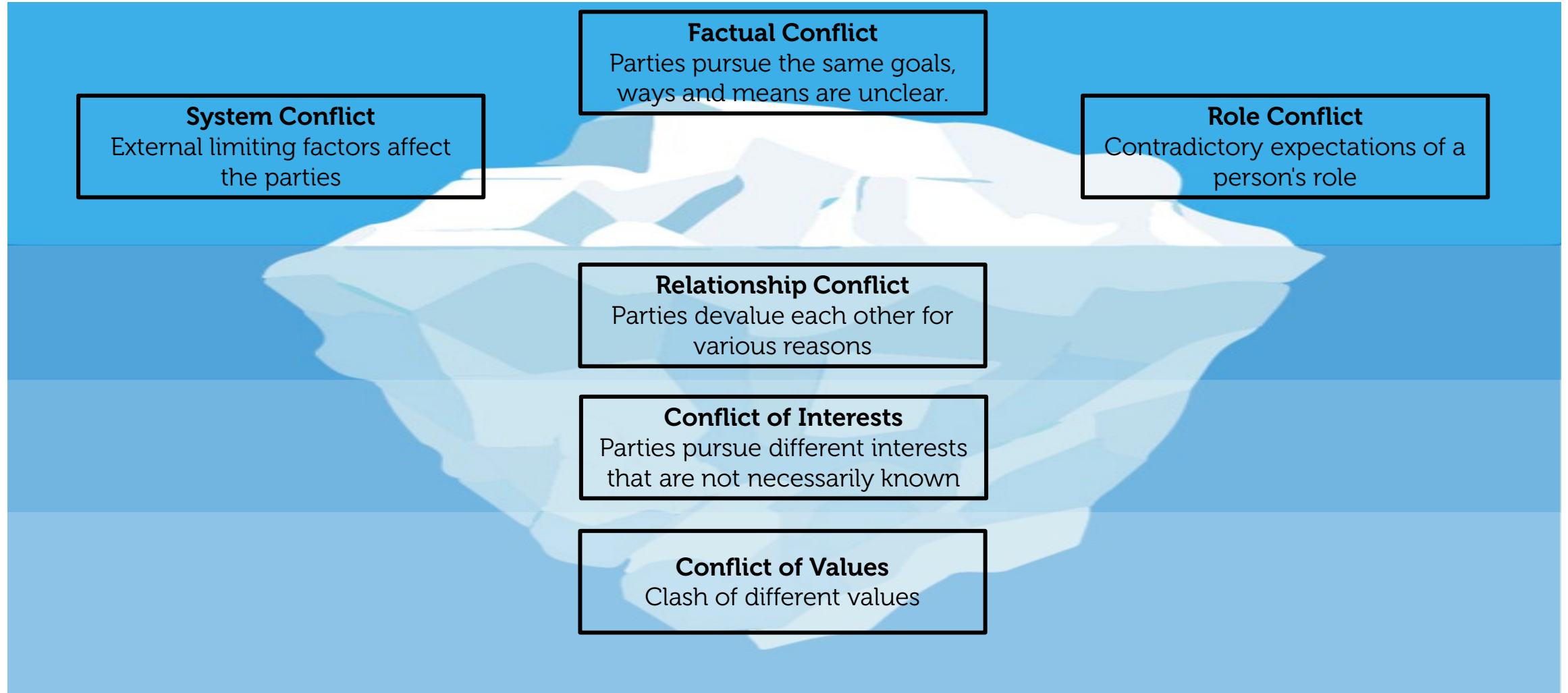
Even More Numbers

10% – 15%

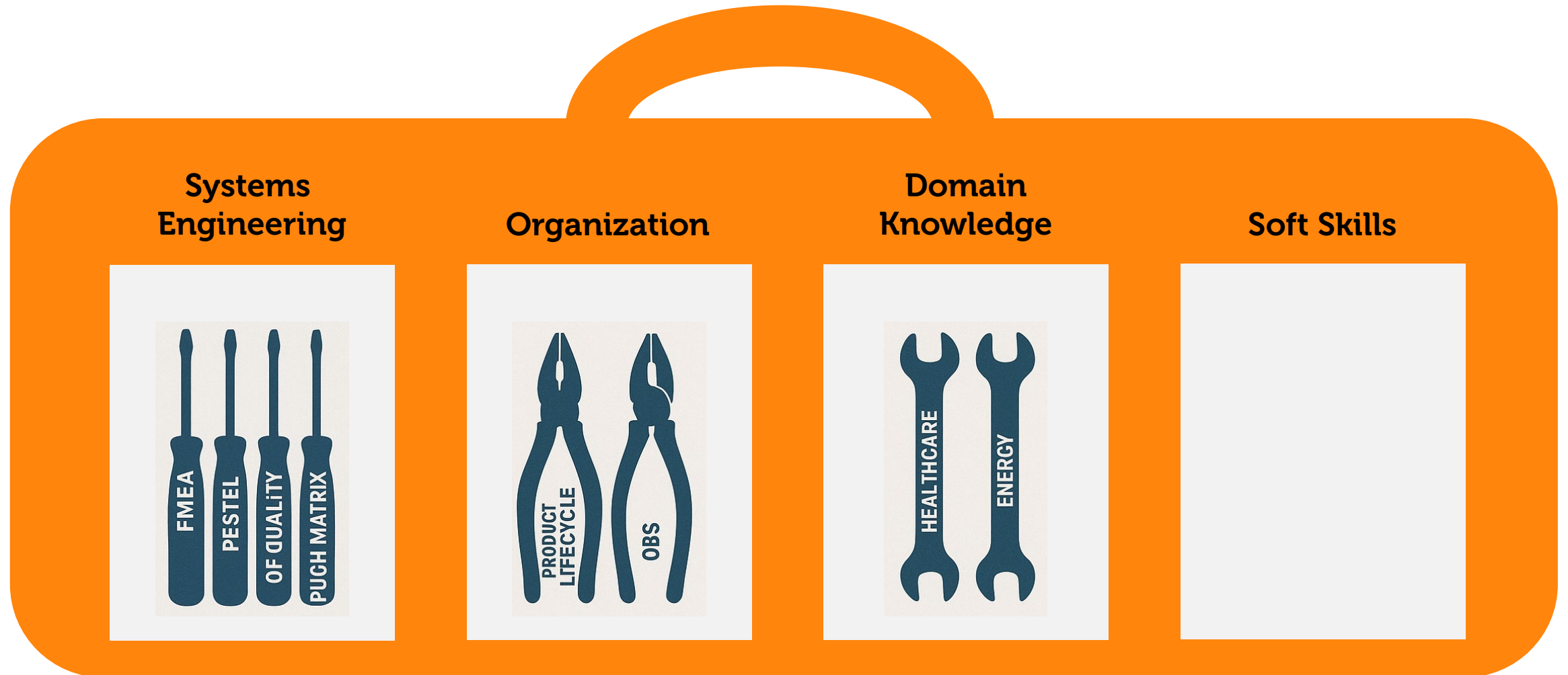
30% – 50%

Source: <https://maluschka.com/blog/horror-studien-fuer-unternehmer-20-prozent-der-personalkosten-finanzieren-konflikte/>

Types of Conflicts



Current Situation



Case Study: The I-Message

Father comes home after a business trip and his three sons are sitting in the living room when he arrives, engrossed in their cell phones.

- I'm at home
- I think you could make more of an effort
- I'm about to leave again
- I hate you!

Key Take-Aways

- Explore INCOSE's systems engineering principles
There's more than meets the eye
- Keep working on appropriate soft skills
They're not a nice-to-have
- Deal confidently with conflicts
They're all around

Let's Get to Work

122.000.000.000€

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**Economic damage
in Germany
caused by conflicts per year**

<https://blog.wiwo.de/management/2019/09/12/gallup-studie-2019-rund-sechs-millionen-beschaefigte-glauben-nicht-an-ihre-unternehmen-mit-122-milliarden-euro-folgeschaeden-schuld-sind-die-fuehrungskraefte-selbst/>

Thank you!