Decoding Complexity: Beyond Technology's Challenges

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Complexity



The complexity of systems continues to increase to unprecedented levels. ISO/IEC/IEEE 15288:2023

A system is an arrangement of parts or elements that together exhibit behavior or meaning that the individual constituents do not.

Most Complex System



Sounds Familiar?



Source: pixabay

• Internal and external interfaces

- Unclear requirements
- Limited resources
- New technologies
- Unrealistic schedules
- Inadequate staffing
- ...

How many of these are technical?

Example: Change Request



Typical Challenges



Source: pixabay

- Internal and external interfaces
- Unclear requirements
- Limited resources
- New technologies
- Unrealistic schedules
- Inadequate staffing
- ...

How many of these are technical?

Stakeholder Requirements Definition

Requirement Set Characteristics

- Complete
- Consistent
- Feasible
- Comprehensible
- Able to be validated
- Correct

Stakeholder Requirements Definition



- Comprehensible
- Able to be validated
- Correct



Systems engineering is about managing conflicts

Source: INCOSE SEHv5

Solving Technical Conflicts



Source: pixabay



Source: pixabay

Systems Engineering Analyses and Methods



Source: pixabay

- Modeling, Analysis, and Simulation
- Prototyping
- Traceability
- Interface Management
- Architecture Frameworks
- Patterns
- Design Thinking
- Biomimicry

Source: INCOSE SEHv5

Enablers for Solving Technical Conflicts

- Frontloading: Identify and solve conflicts early
- Communication and networking: Identify and involve key stakeholders early
- Environment and leadership: Create an atmosphere in which conflicts can be solved in a constructive manner
- Holistic view: Challenge your biases and patterns

Conflict Management

Types of Conflicts

- Intrapersonal
- Interpersonal
- Intragroup
- Intergroup

Causes of Conflict

- Task
- Relationship
- Values



Source: pixabay

Solving Non-Technical Conflicts



Source: pixabay

- Problem Solving / Collaboration / Confronting
- Compromising / Reconciling
- Withdrawing / Avoiding
- Forcing / Competing
- Smoothing / Accommodating

Can we treat technical and non-technical conflicts the same way?

Reminder



Source: pixabay

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- ...

How many of these are technical?

Key Aspects of a Successful Lead Systems Engineer



Source: pixabay

1) Appropriate soft skills and a disposition to systems thinking

- 2) Knowledge of the discipline of Systems Engineering
- 3) Knowledge of the domain
- 4) Knowledge of the organization

Key Takeaways

- Most systems are complex
- Systems engineering is about managing conflicts
- Understand the environment / context
- Networking and communication is key
- Do your homework

Thank you!