FuSE
Future of Systems Engineering

INCOSE FuSE Future of Systems Engineering

How might we advance Systems Engineering Methodologies to Engineer a more Sustainable World?

A FuSE Breakout at

IEEE SYSC TC-SEM: 9 May 2023, 11:00-12:00 EDT

Chris Hoffman
Systems Engineering Methodologies Lead

Systems engineering is more important- and more valued- due to rising complexity, increased interconnectivity, and societal impacts.

INCOSE®

A better world through a systems approach

Systems engineering will:

- make significant advancements to deal with complexity and enable enterprise agility
- Leverage practices from other disciplines
- be impacted by Artificial Intelligence

Breakout Description

Visit https://www.incose.org/fuse for downloads and Yammer link

How might we evolve System Engineering Methodologies to engineer a sustainable world effectively? Participants will leverage the SE Vision 2035 publication (www.incose.org/sevision), prior Future of Systems Engineering content (www.incose.org/FuSE), and their own knowledge to elaborate on methodology gaps and propose paths to move towards realizing this vision.

FuSE Breakout at IEEE SYSC TC-SEM 09 May 2023

- **Future of Systems Engineering (FuSE)**
- Prior Results
- Breakout: Reflections & Progress
- Next steps

Ice-Breaker!

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Systems Engineering Vision 2035

Executive Summary

- The Global Context for Systems Engineering
- The Current State of Systems Engineering
- The Future State of Systems Engineering
- Realizing the Vision

5 Categories:

https://www.incose.org/about-systems-engineering/se-vision-2035

Applications

1. Systems engineering contributes innovative solutions to major societal challenges.

2. Systems engineering demonstrates value for projects and enterprises of all scales, and applies across an increasing number of domains.

Practices

3. Systems engineering anticipates and effectively responds to an increasingly dynamic and uncertain environment.

4. Model-based systems engineering, integrated with simulation, multi-disciplinary analysis, and immersive visualization environments is standard practice.

5. Systems engineering provides the analytic framework to define, realize, and sustain increasingly complex systems.

6. Systems engineering has widely adopted reuse practices such as product-line engineering, patterns, and composable design practices.

Tools and Environment

7. Systems engineering tools and environments enable seamless, trusted collaboration and interactions as part of the digital ecosystem.

Research

8. Systems engineering practices are based on accepted theoretical foundations and taught as part of the systems engineering curriculum.

Competencies

9. Systems engineering education is part of the standard engineering curriculum, and is supported by a continuous learning environment.

FuSE Methodologies Stream Output

Guides the advancement of:

- practices, methods, and tools
- for the effective engineering of systems to be fit for purpose

in the presence of:

- varying scale, interrelatedness, complexity, non-determinism,
- and emerging technology innovations such as AI and agility.

Stimula and support with:

- working groups, initiatives, organizations

Coordination and collaboration on:

- workshops, papers, publications, products

Discussions > Activities > Presentations > Panels > Papers > Periodicals > Products > Practices > Standards

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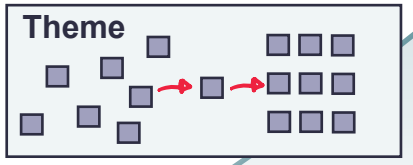
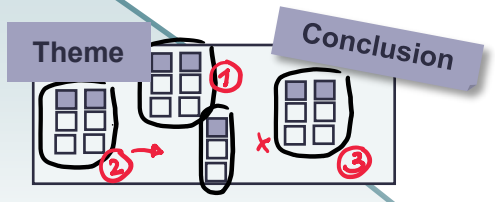
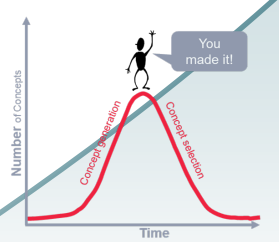
INCOSE International Workshop 2023
FuSE Methodologies Stream Workshop Summary

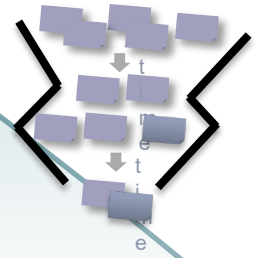
SUNDAY

MONDAY









8 Themes

e.g.:

- What is a successful methodology?
- What is preventing advancement of new technology for SE methodologies?
- What are the obstacles in advancing MBSE?

240 pain points

8 conclusion

e.g.:

- Uncertainty in ecosystem discourages adoption.
- Even if I had the infrastructure and resources, I have tried before and failed, and I don't have time to learn a new way from people I don't trust.

~10 disrupters

~ 180 concepts

~ 25 favorite concepts

e.g.:

- Create value metrics
- Human-System-Interface model
- Promote & research other MBSE methodology that support interoperability natively
- Procedures for generating models

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Perspective

Inspired by the key role Systems Engineering can play in achieving the United Nations Sustainable Development Goals (UN SDGs), targeting Societal Challenges and focusing on highly complex/chaotic systems aligned with the INCOSE Vision 2035 for a better world.

United Nations Sustainable Development Goals

What is preventing advancement of Systems Engineering as the leading methodology?

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Let's connect.

Or find us on
www.incose.org/fuse

Email fuse@incose.net

Bill Miller
FuSE Program Lead

e William.Miller@incose.net

Stephan Finkel
PMO Contractor | 3DSE

e Stephan.Finkel@incose.net

Martina Feichtner
PMO Contractor | 3DSE

e Martina.Feichtner@incose.net

Paul Schreinemakers
Stream Lead "SE Vision & Roadmaps"

e paul.schreinemakers@incose.net

Oli de Weck
Stream Lead "SE Foundations"

e deweck@mit.edu

Chris Hoffman
Stream Lead "SE Methodologies"

e christopher.hoffman@incose.net

Tom Strandberg
Stream Lead "SE Application Extensions"

e tom.strandberg@incose.net

fuse@incose.net