# Development of SEBoK v. 2.9

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This version was released on 20 November 2023. This release included:

- Governance and Editorial Boards changes including a new Editor-in-Chief and Managing Editor
- A new article on Reverse Engineering a UAV Prototype using Agile Practices
- A new article on System Security that replaces the one found in SEBoK 2.8
- A new article on the An Overview of the SWEBOK Guide that replaces the one found in SEBoK 2.8
- An updated article on Loss Driven Systems Engineering, A Framework for Viewing Quality Attributes from the Lens of Loss
- An updated article on System Resilience
- A transition from the use cases originally published in SEBoK v. 1.0 to more persona-driven guidance for different types of users
- Minor updates to articles throughout the SEBoK

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## Contents

## Governing Board for version 2.9

The three SEBoK steward organizations – the International Council on Systems Engineering (INCOSE),

the Institute of Electrical and Electronics Engineers Systems Council (IEEE-SYSC), and Stevens Institute of Technology – provide the primary funding and resources needed to sustain and evolve the SEBoK and make it available as a free and open resource to all. The stewards appoint the BKCASE Governing Board to be their primary agents to oversee and guide the SEBoK. The stewards appoint the SEBoK Editor in Chief to manage the SEBoK and oversee the Editorial Board.

The BKCASE Governing Board includes:

- Representing the **The International Council on Systems Engineering (INCOSE)**
  - Art Pyster (Governing Board Chair), Emma Sparks
- Representing the **Systems Engineering Research Center (SERC)**
  - Thomas McDermott, Cihan Dagli
- Representing the **IEEE Systems Council (IEEE-SYSC)**
  - Stephanie White, Bob Rassa

Past governors include Andy Chen, Richard Fairley, Kevin Forsberg, Paul Frenz, Richard Hilliard, John Keppler, Bill Miller, David Newbern, Ken Nidiffer, Dave Olwell, Massood Towhidnejad, Jon Wade, David Walden, and Courtney Wright. The governors would especially like to acknowledge Andy Chen and Rich Hilliard, IEEE Computer Society, who were instrumental in helping the governors to work within the IEEE CS structure and who supported the SEBoK transition to the IEEE Systems Council.

# Editorial Board for version 2.9

The SEBoK Editorial Board is chaired by the *Editor in Chief*, who provides the strategic vision for the SEBoK. The EIC is supported by a group of Editors, each of whom is responsible for a specific aspect of the SEBoK. The EIC and Editorial Board are supported by the Managing Editor, who handles all day-to-day operations. The EIC, Managing Editor, and Editorial Board are supported by a Student Editor, Madeline Haas, whose hard work and dedication are greatly appreciated.

**SEBoK Editor in Chief**

**Nicole Hutchison**

*Systems Engineering Research Center (SERC)*

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nicole.hutchison@stevens.edu or emtnicole@gmail.com Responsible for the appointment of SEBoK Editors and for the strategic direction and overall quality and coherence of the SEBoK.

**SEBoK Managing Editor**

**Chris Hoffman**

*INCOSE, Cummins Inc.*

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christopher.hoffman@incose.net Responsible for the the day-to-day operations of the SEBoK and supports the Editor in Chief.

You can reach out to both the Editor in Chief and the Managing Editor by emailing [1].

Each Editor has their area(s) of responsibility, or shared responsibility, highlighted in the table below.

**SEBoK Part 1: SEBoK Introduction**

**Lead Editor: Nicole Hutchison**
*Systems Engineering Research Center (SERC)*
emtnicole@gmail.com

**SEBoK Part 2: Foundations of Systems Engineering**

**Lead Editor: Gary Smith (UK)**
*Airbus and International Society for the System Sciences*
gary.r.smith@airbus.com
Responsible for the System Science Foundations of System Engineering.

| **Assistant Editor: Dov Dori** | **Assistant Editor: Duane Hybertson** |
|---|---|
| *Massachusetts Institute of Technology (USA) and Technion Israel Institute of Technology (Israel)* dori@mit.edu Responsible for the Representing Systems with Models knowledge area | *MITRE (USA)* dhyberts@mitre.org Jointly responsible for the Systems Fundamentals, Systems Science and Systems Thinking knowledge areas. |

**Assistant Editor: Emma Sparks**
*Cranfield University*
Jointly responsible for the Enabling Individuals and Enabling Teams knowledge areas.

**Assistant Editor: Rick Hefner**
*California Institute of Technology*
Rick.Hefner@ngc.com

### SEBoK Part 6: Related Disciplines

**Lead Editor: Art Pyster**
*George Mason University (USA)*
apyster@gmu.edu

### SEBoK Part 7: Systems Engineering Implementation Examples

**Lead Editor: Clif Baldwin**
*FAA Technical Center*
cliftonbaldwin@gmail.com

### SEBoK Part 8: Emerging Knowledge

**Lead Editor: Daniel DeLaurentis**
*Purdue University*
ddelaure@purdue.edu

**Assistant Editor: Ha Phuong Le**
*Purdue University*
haple104@gmail.com

### SEBoK Cross-Cutting: Digital Engineering

**Lead Editor: Robert J. Cloutier**
*University of South Alabama*
rcloutier@southalabama.edu

### SEBoK Cross-Cutting: Standards

**Lead Editor: Garry Roedler**
*Retired Senior Fellow at Lockheed Martin*
[2]

## Student Editor

### SEBoK Student Editor

**Eleni Canez**
*University of Arizona*
elcanez@arizona.edu
Eleni Canez, an undergraduate student at University of Arizona, is currently supporting the SEBoK Managing Editor and Editor in Chief. We are deeply appreciative of the work Eleni has done and look forward to continuing to work with her.

# Editor's Corner

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*The* Editor's Corner *provides perspective from the Editor in Chief on critical topics for systems engineering, either through their own words or by inviting a guest writer.*

**20 November 2023**

The formal discipline of systems engineering emerged in the first half of the 20th century. Over the last 80+ years, it has evolved from first principles to a process-focused field that generally operates in the defense and aerospace domains to a transdisciplinary one focusing on the integration and interaction between technology and people across a variety of domains. In its *Vision 2035*, the International Council on Systems Engineering (INCOSE), states that "the practice of systems engineering will further evolve to support the demands of ever-increasing system complexity and enterprise competitiveness. By 2035, systems engineering will leverage the digital transformation in its tools and methods and will be largely model-based using integrated descriptive and analytical digital representations of the systems. Systems design, analysis, and simulation models, immersive technologies, and an analytic framework will enable broad trade-space exploration, rapid design evolution, and provide a shared understanding of the system throughout its life cycle."

The Systems Engineering Research Center (SERC) led the initial creation of the *Guide to the Systems Engineering Body of Knowledge* (SEBoK, pronounced "see-bach"). In 2009, the SERC began the three-year process of developing the SEBoK with a team of over 70 authors from around the world. Version 1.0 was published in 2012 and inpast 11 years the SEBoK has evolved in many ways: new topics, the inclusion of videos, a major rearrangement of the discussion, and

perhaps most importantly, the addition of an area dedicated to the emerging topics of systems engineering.

Over the years, the SEBoK has been led by several Editors in Chief:

- Art Pyster and Dave Olwell led the development of SEBoK through version 1.0, including the decision to implement the SEBoK as a wiki.
- Rick Adcock, appointed the first Editor in Chief after the transition of SEBoK from a research task to a community-led effort, helped identify new members of the editorial board and oversaw the addition of the first domain-focused knowledge area, Healthcare Systems Engineering.
- Rob Cloutier added the first new part to the SEBoK since its initial release: Emerging Knowledge, which captures topics that are critical for systems engineers but for which the knowledge is not yet settled (e.g. artificial intelligence applications to systems engineering). Rob also fostered the addition of multi-media to the SEBoK and created and built upon articles about the discipline, including A Brief History of Systems Engineering.

I am honored to have been asked to be the newest Editor in Chief of the SEBoK. And like every Editor in Chief before me, I am extremely lucky to work with a group of editors and authors from around the world that have consistently supported the SEBoK. These people are critical representatives of the global systems engineering community, and the SEBoK would not be possible without their tireless efforts.

Looking forward as the discipline of systems engineering evolves, the SEBoK will need to evolve with it. At my first INCOSE International Symposium in 2008, I heard about something called "model-based systems engineering". The last 5 years have seen a tremendous push toward "digital engineering". Both of these are currently reflected in the SEBoK, but we need to do more. Digital transformation is a critical topic for systems engineers and will continue to be for at least the next decade. But the true end state is not that we as a discipline create new pockets of practice but that instead we move as a community toward a data- and model-enabled way of working. My sincere hope is that in 2033, we will talk not about MBSE or DE but about systems engineering with models and data a standard part of practice. To that end, I'm pleased to share that we have assembled a team

whose mission is to integrate the discussion of using models and data throughout the SEBoK and that Rob Cloutier has agreed to spearhead this effort.

Finally, I encourage anyone with an interest to reach out to the SEBoK team sebok@incose.net. We welcome your feedback and insights and look forward to partnering with you as we move toward the SEBoK of the future.

Sincerely,

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**SEBoK v. 2.10, released 06 May 2024**

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