

Scope of the SEBoK

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The SEBoK is a large, curated compendium of information about systems engineering. It:

- is a guide to the body of SE knowledge which provides references to detailed sources for additional information; it is not a self-contained knowledge resource
- focuses on Engineered Systems contexts, that is socio-technical systems with a recognized SE life cycle, while treating social and natural systems as relevant and important environmental considerations (see Part 2)
- describes generic SE life cycle and process knowledge (see Part 3)
- recognizes that SE principles can be applied differently to different types of products, services, enterprises, and systems of systems (SoS) context (see Part 4)
- provides resources for organization support of SE activities (see Part 5)
- explores the interaction between SE and other disciplines, highlighting what systems engineers need to know about these disciplines (see Part 6)
- is domain-independent, with implementation examples to provide domain-specific context (see Part 7)

Each of these considerations depends upon the definition and scope of SE itself, which is the subject of the next section.



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SEBoK Purposes

Ongoing studies of system cost and schedule failures (Gruhl & Stutzke 2005; Johnson 2006, GAO 2016) and safety failures (Leveson 2012) have shown that the failures have mostly come not from their domain disciplines, but from lack of adequate Systems Engineering (NDIA 2003, 2006, 2016). To provide a foundation for the mutual understanding of SE needed to reduce these failures, the SEBoK describes the boundaries, terminology, content, and structure of SE. In so doing, the SEBoK systematically and consistently supports six broad purposes, described in Table 1.

Table 1. SEBoK Purposes. (SEBoK Original)

#	Purpose	Description
1	Inform Practice	Inform systems engineers about the boundaries, terminology, and structure of their discipline and point them to useful information needed to practice SE in any application domain.
2	Inform Research	Inform researchers about the limitations and gaps in current SE knowledge that should help guide their research agenda.
3	Inform Interactors	Inform performers in interacting disciplines (system implementation, project and enterprise management, other disciplines) and other stakeholders of the nature and value of SE.
4	Inform Curriculum Developers	Inform organizations defining the content that should be common in undergraduate and graduate programs in SE.
5	Inform Certifiers	Inform organizations certifying individuals as qualified to practice systems engineering.

6 Inform SE Staffing	Inform organizations and managers deciding which competencies practicing systems engineers should possess in various roles ranging from apprentice to expert.
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The SEBoK is a guide to the body of SE knowledge, not an attempt to capture that knowledge directly. It provides references to more detailed sources of knowledge, all of which are generally available to any interested reader. No proprietary information is referenced, but not all referenced material is free—for example, some books or standards must be purchased from their publishers. The criterion for including a source is simply that the authors & editors believed it offered the best generally available information on a particular subject.

The SEBoK is global in applicability. Although SE is practiced differently from industry to industry and country to country, the SEBoK is written to be useful to systems engineers anywhere. The authors & editors were chosen from diverse locales and industries, and have refined the SEBoK to broaden applicability based on extensive global reviews of several drafts.

The SEBoK aims to inform a wide variety of user communities about essential SE concepts and practices in ways that can be tailored to different enterprises and activities while retaining greater commonality and consistency than would be possible without the SEBoK. Because the world in which SE is being applied continues to evolve and is dynamic, the SEBoK is designed for easy, continuous updating as new sources of knowledge emerge.

SEBoK Uses

The communities involved with SE include its various specialists, engineers from disciplines other than systems engineering, managers, researchers, and educators. This diversity means that there is no single best way to use the SEBoK. The SEBoK includes use cases that highlight potential ways that particular communities can draw upon the content of the SEBoK, identify articles of interest to those communities, and discuss primary users (those who use the SEBoK directly) and secondary users (those who use the SEBoK with assistance from a systems engineer). For more on this, see the article SEBoK Users and Uses.

SEBoK Domain Independent Context

The SEBoK uses language and concepts that are generally accepted for domain-independent SE. For example, the domain-independent conceptual foundations of SE are elaborated in Part 2: Foundations of Systems Engineering. However, each of the numerous domains in which SE is practiced — including telecommunications, finance, medicine, and aerospace — has its own specialized vocabulary and key concepts. Accordingly, the SEBoK is designed to show how its domain-independent material relates to individual domains in two ways.

Firstly, by means of examples that tell stories of how SE is applied in particular domains. Part 7: Systems Engineering Implementation Examples) consists of examples (case studies and vignettes), each set in a particular domain such as aerospace, medicine, or software, and featuring vocabulary and concepts special to that domain. There are similar vignettes in some of the Use Cases in Part 1. These examples demonstrate the effect of domain on the application of SE and complement the domain-independent information elsewhere in the SEBoK. They show how a concept works in a given domain and provide a fair opportunity for reviewers to reflect on whether there are better ways to capture application-dependent aspects of SE knowledge.

In addition, the SEBoK will contain knowledge areas in Part 4: Applications of Systems Engineering which explicitly describe the domain specific language, approaches, specialized processes and tools, etc. of particular application domains. In this version of the SEBoK, there are a limited set of domain knowledge areas.

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Primary References

None.

Additional References

None.

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