Related Disciplines

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Systems engineers routinely work within broad multidisciplinary teams (Pyster et al. 2018) and across many disciplines. Part 6 of the SEBoK presents knowledge that should be useful to systems engineers in two ways: (1) systems engineers benefit from knowing aspects of these disciplines directly; e.g. given how central software is to the functioning of virtually every interesting engineered system, a systems engineer should know a fair amount about software and software engineering; and (2) systems engineers routinely interact with these other fields and professionals in those fields.

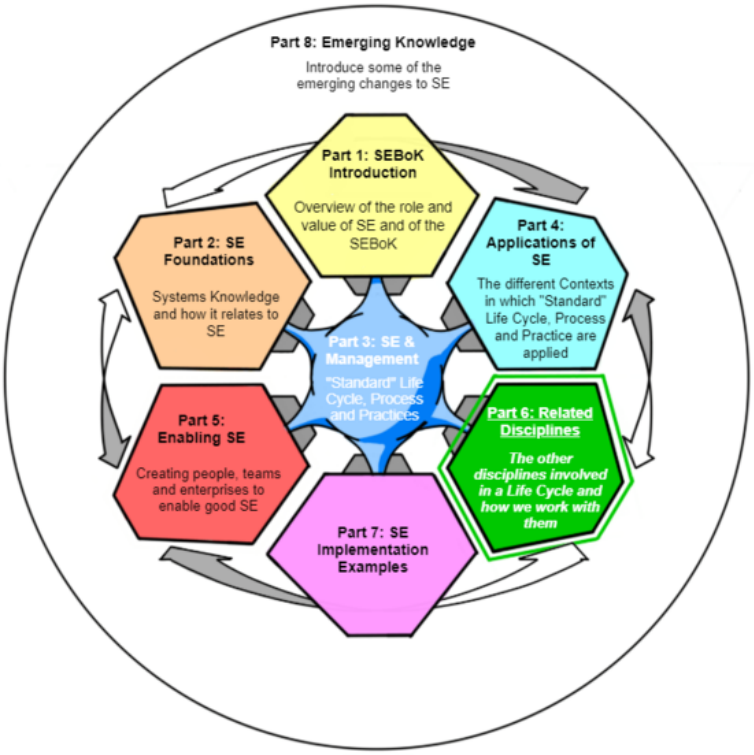
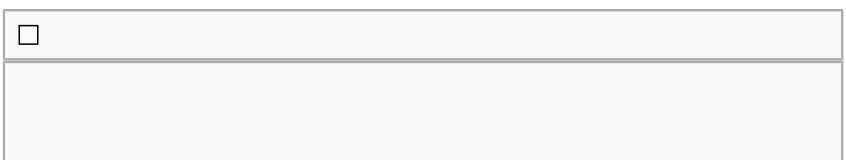


Figure 1 SEBoK Part 6 in context (SEBoK Original). For more detail see Structure of the SEBoK

SE intersects with virtually every other recognized discipline. Besides the other engineering disciplines such as electrical and mechanical engineering, SE intersects with the physical sciences, social sciences, project management, philosophy, etc. For example, a systems engineer leading the design of an autonomous car would work with electrical engineers, software engineers, project managers, mechanical engineers, computer scientists, radio engineers, data analysts, human factors specialists, cybersecurity engineers, economists, and professionals from many other disciplines. The knowledge areas (KAs) contained in Part 6 and the topics under them provide an overview of some of these disciplines with emphasis on what a systems engineer needs to know to be effective, accompanied by pointers to that knowledge. The KAs included in Part 6 could run into the dozens, but only a handful are addressed in this version of the SEBoK. Subsequent SEBoK releases will expand the number of related disciplines and offer deeper insight into their relationship with SE.



Contents

Knowledge Areas in Part 6

Each part of the SEBoK is divided into knowledge areas (KAs), which are groupings of information with a related theme. Part 6 contains the following KAs:

- Systems Engineering and Enterprise IT
- Systems Engineering and Environmental Engineering
- Systems Engineering and Geospatial/Geodetic Engineering
- Systems Engineering and Industrial Engineering
- Systems Engineering and Mechanical Engineering
- Systems Engineering and Project Management
- Systems Engineering and Software Engineering
- Systems Engineering and Quality Attributes

Each KA above except the last is a major well-recognized stand-alone discipline. Each is widely taught in universities around the world, has professional societies devoted to it, standards that assist its practitioners, publications that describe its knowledge and practices, and a vibrant community of practitioners and researchers who often have one or more university degrees in the discipline. The last KA is different. It describes the disciplines associated with engineering system qualities or properties; e.g., security is a system quality. Security engineering is the discipline through which system security is realized in a system. The security of a modern car is widely understood to be a function of many factors such as the strength of its physical exterior, its alarm system which may have extensive sensors and software, and its communications system which can wirelessly alert the owner or police if someone attempts to break into it. Similarly, the reliability of a car is a function of such factors as the reliability of its individual subsystems and components (mechanical, electronic, software, etc.) and how the car has been designed to compensate for a failed subsystem or component (e.g. if the electronic door lock fails, can

the driver use a physical key to lock and unlock the car?). The topics included in this KA are among the most important qualities a systems engineer would typically consider.

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Additional References

None.

< Previous Article (Part 5) | Parent Article | Next Article >
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