



Body of Knowledge and Curriculum to Advance Systems Engineering

**Sixth Workshop on
SEBoK 0.5/Wiki Development
and
GRCSE 0.25 Reviews**



April 12-14, 2011

University of Southern California

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WORKSHOP REPORT

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1. BKCASE Project

BKCASE is the acronym for the Body of Knowledge and Curriculum to Advance Systems Engineering. The BKCASE project is led by a university partnership between the Stevens Institute of Technology and the Naval Postgraduate School with sponsorship from the U.S. Department of Defense and support from INCOSE, the IEEE Computer Society, IEEE Systems Council, ACM, and NDIA Systems Engineering Division. The project scope is to define a Systems Engineering Body of Knowledge (SEBoK) and use the SEBoK to develop a Graduate Reference Curriculum for Systems Engineering (GRCSE).

The ideal outcome is that the SEBoK will be supported worldwide by the Systems Engineering community as the authoritative SEBoK for the SE discipline; and that the GRCSE will receive the same global recognition and serve as the authoritative guidance for graduate degree programs in SE. Systems engineers from across the world have volunteered as authors and reviewers on the project to collaborate over a three year period and to deliver the SEBoK and GRCSE to the public in 2012.

In December 2009, the BKCASE team held an inaugural workshop in Monterey, CA, at the Naval Postgraduate School to determine the basic rules for the project and develop a common set of objectives. In addition, the team developed an initial strategy to begin work on SEBoK version 0.25, which included using ISO 15288 as the initial structure for the SEBoK. In March 2010 at the second workshop in Daytona Beach, Florida the team expanded the SEBoK contents to include many other areas of systems engineering knowledge and life cycle processes. In Florida the initial GRCSE team was identified. The author team broke into subteams to begin drafting materials for review at the third Workshop. At the third workshop in July 2010, held in conjunction with the INCOSE International Symposium, the author team agreed to the publication and review plans for SEBoK 0.25 and discussed the way ahead for the development draft of GRCSE 0.25. The fourth workshop in October 2010, held in Toulouse, France, was the first opportunity for authors to discuss the final release version of SEBoK 0.25 and for them to focus on preparing the release of GRCSE 0.25. GRCSE 0.25 was released for review on December 17, 2010. The fifth workshop in January 2010, held in Phoenix, Arizona, focused on the review comments received for SEBoK 0.25 and the publication version of GRCSE 0.25.

2. BKCASE Workshop VI

The sixth workshop was hosted by the University of Southern California in Los Angeles, California, USA on April 12th through 14th, 2011. A list of the workshop attendees is available in Appendix A and the meeting agenda in Appendix B of this report. The workshop's slide set is available online for download at the BKCASE website located at <http://www.bkcase.org>.

The first two days of the workshop were plenary sessions. The third day opened with plenary sessions, but evolved into breakout sessions for the SEBoK part teams and GRCSE team to resolve issues identified during the workshop independently. The final part of the third day concluded with outbriefs from the breakout teams.

The objectives of the workshop were:

1. To review the progress to date of the Part teams for SEBoK v0.5
2. To resolve any residual issues from the SEBoK 0.25 reviews.
3. To complete and refine the draft development plan for SEBoK 0.5.
4. To agree on the plan for utilizing the Wiki environment to develop and publish SEBoK 0.5 for review.
5. To agree on plan for dealing with SEBoK 0.5 terms and references.
6. To discuss and resolve global issues related to the GRCSE 0.25 review.
7. To review BKCASE staffing for SEBoK, GRCSE, Wiki, and Case Studies and update as appropriate.
8. To refine topical outlines and continue drafting materials for SEBoK 0.5 (each Part team).

The authors believe that they fulfilled the objectives adequately.

During Art Pyster's introductory comments, he provided an overview of the community response to GRCSE 0.25 and the overarching progress to date on SEBoK 0.25. While he stated there is a lot of work to do, the community was generally positive about the project and appreciative of the author team's efforts.

3. Workshop Proceedings

3.1 SEBoK 0.5 Content

At Workshop V in Phoenix, AZ, the author team agreed to re-organize the SEBoK into 5 parts. Work from Workshop V to Workshop VI focused on better defining and outlining these parts, and determining if this structure makes sense. The general consensus among the authors is that this approach works. There were some specific issues for the SEBoK as a whole that were resolved at the workshop. These include:

1. **Treatment of Standards.** SEBoK will, of course, refer to standards and cite references when appropriate. However, SEBoK 0.25 contained an overarching discussion of SE standards. While review comments from the community indicate that this may not be mature, the author team agreed that a discussion of standards is important. For SEBoK 0.5, Part 3 will develop a discussion of standards based on 0.25 materials that will be updated to reflect the review comments. Other parts will refer to this discussion as appropriate.
2. **Product/Service/Enterprise (PSE).** SEBoK 0.25 introduced the idea of discussing systems engineering information in terms of product, service, and enterprise (PSE) systems. The concept is that different types of systems may have unique attributes or considerations for the SE process. In 0.25, these were addressed separately. For SEBoK 0.5, the author team agreed that:
 - a. **The concepts of PSE systems will be addressed in Part 2.** These system types will be defined, characterized, etc. Other Parts will refer back to this information.

4. Most Parts have begun to identify potential primary references.

3.1.3 SEBoK 0.5 Part Updates

The following is a brief summary of the progress for each Part at the close of Workshop VI. (All workshop briefings can be found on the secure Sakai collaboration site). The SEBoK will contain 5 parts with a structure of three levels, to include the Part Title, Knowledge Areas (KAs), and topics, as outlined below:

- **Part 1: Introduction.** This section provides the “opening” material to the SEBoK. Principally, the section will introduce the SEBoK (context, purpose, and scope), the concepts of systems and systems engineering (including an introduction to the history of SE), a discussion of related disciplines, the use cases for the SEBoK, a guide to using the SEBoK and the SEBoK organization/content. Some of this material will be unique and generated specifically by the Part 1 team. Some of the material may actually be drafted in other parts and folded in using cross-linking. (Please see section 3.2 on SEBoK 0.5 Wiki for further discussion of this point.)
- **Part 2: Systems.** This part focuses on defining what is created by systems engineering and on providing links into the appropriate aspects of systems science. Specifically, Part 2 will provide a discussion of what systems are, provide system principles (truisms about systems which are important for systems engineering), discuss the different types of systems (including introducing the PSE concepts), provide information on different representations of systems (models), and discuss the systems approach (including aspects of systems thinking) and systems engineering challenges. The systems approach and systems engineering challenges in particular will have strong links to Parts 3 and 4. The Part 2 has begun coordinating with these teams to ensure these linkages are appropriately developed.
- **Part 3: Systems Engineering.** This part specifically focuses on how SE is conducted. It includes discussion of the traditional SE processes, such as definition, realization, and deployment and use, as well as SE management processes such as risk, decision, information, and configuration management. Part 3 will also include an overview of life cycles, product and service life management, and specialty engineering. This part is expected to comprise approximately 50% of the SEBoK and is focused around what is traditionally viewed as systems engineering. It will also include information on documented best practices or common pitfalls for performing SE or systems management activities.
- **Part 4: Organizing to Perform Systems Engineering.** This knowledge area deals with the different ways in which a group can organize to perform SE activities. Specifically, Part 4 discusses strategies for organizing for SE (including value propositions, purpose, and governance), considerations for individuals within an organization (including competency, personal SE development, and ethics), considerations for groups (teams, projects, programs), and a discussion of the business/enterprise perspective.
- **Part 5: Implementation Examples.** This part provides real-world examples of SE activities and links the concepts in those activities to the SEBoK. There are two main types of examples: case

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studies and vignettes. Case studies are existing case studies that examine the successes and challenges in past SE programs; the Part 5 team then provides linkages from the case study information to the related SEBoK knowledge areas (KAs) and topics. Vignettes are smaller-scale examples, but are still based on real-world systems. For SEBoK 0.5, the Part 5 team hopes to have 10 examples (a mixture of vignettes and case studies). It is important to note that discussion of these examples is centered around links to the SEBoK; it is *not* intended that there will be value judgments about the examples or systems they describe.

By the end of Workshop VI, each Part team had an outline of its proposed part (including knowledge areas and some topics). For a compiled list of the SEBoK part/knowledge area/topic structure, please see Appendix C.

3.1.3 SEBoK 0.5 Staffing

The staffing for SEBoK 0.5 development was reviewed on Day 2. The following table is the summary of individuals working on each of the parts.

Part	Lead(s)	Core Team Rep	Members
1	Barry Boehm	Art Pyster	Part Leads/Core Team to support
2	Rick Adcock	Nicole Hutchison	Erik Aslaksen, Bud Lawson, Dave Long, Richard Beasley, Brian Wells, Sandy Friedenthal, Scott Jackson, Cihan Dagli
3	Bud Lawson/ Garry Roedler	Dave Olwell	Charles Dickerson, Bill Stiffler, Bud Lawson, James Martin, Hillary Sillitto, Richard Freeman, Barry Boehm, Kevin Forsberg, Alain Faisandier, Jeremy Dick, Judith Dahmann, Mike Henshaw, Ed Conrow, Brian Gallagher, Scott Jackson, Massood Towidnejad, Jean Claude Roussel, Paul Croll, Ricardo Valerdi, Mo Jamshidi, John Snoderly, Cihan Dagli, Brian Wells, Ray Madachy, Ken Nidiffer, Stuart Booth
4	Art Pyster	Alice Squires	Ken Nidiffer, Richard Beasley, Heidi Davidz, Hillary Sillitto, Jim Anthony, Dick Fairley
5	Heidi Davidz	Alice Squires	John Brackett, Richard Freeman, Kevin Forsberg, Tom Hilburn, Alex Lee, Aaron Chia

Authors who did not attend the workshop were tentatively identified for parts, but the Core Team/Part Team Leads will confirm this. For the complete staffing matrix, please see Appendix D. In addition, several potential new authors were identified for the parts. For each potential author, a BKCASE point of contact (POC) was assigned to approach the author and invite them to the team. If they accept, they will become formal members of the BKCASE author team.

3.1.3 SEBoK 0.5 Development

Because the SEBoK 0.5 will be developed in a wiki environment, the discussion of the way ahead can be found in section 3.2, SEBoK 0.5 Wiki.

SEBoK Action Items:

1. Begin documenting the actions resulting from the review comments in the adjudication matrices in preparation for the June 2011 WS VII. *Part Team Leads*
2. Complete and further refine the part outlines for the Baseline Structure by 30 April. *Part Teams/Leads*

3.2 SEBoK 0.5 Wiki

Nicole Hutchison opened by providing an overview of the progress on a SEBoK wiki environment since Workshop V held in January 2011. After this, she reviewed the proposed way ahead for wiki development, which was refined based on the authors' comments.

3.2.1 Progress Since Workshop V

At Workshop V, the author team agreed to move forward with developing a wiki environment for the SEBoK. The development model agreed to was that during development the team would use a private, open wiki; this is a wiki that can only be viewed with a log-in, but which anyone with a log-in can edit. During publication and review, the team will use a protected, static wiki; this is a wiki that can be viewed by anyone, but which can not be edited without authorization. A mock-up of a potential structure was provided (see Appendix E) and the author team agreed to this principle. The author team agreed that the ability for the community to comment on content was critical.

Since Workshop V, the wiki team has selected MediaWiki as the technology moving forward. A hosting company was also selected. (For specific information on the selection processes, please contact [Nicole Hutchison](#).)

The host company has installed MediaWiki and linked it to the URLs purchased for the SEBoK wiki: www.bkcasewiki.org and www.sebokwiki.org. The wiki team has installed a plug-in called LiquidThreads which will allow threaded discussions on the content.

Nicole provided a demonstration of the wiki environment and capabilities using some draft material provided by Part 2. She explained that the wiki has not yet been formatted as desired (see Appendix E) but that this format was still desired.

3.2.2 Overarching Guidance for Wiki Development

The shift from a document-based SEBoK to a wiki-based SEBoK will require some adjustments in author thinking. Nicole provided some guidance to help the authors consider how to approach this, which has been refined based on discussion during the workshop:

1. **Definition of an Article**—An article is the basic unit of a wiki. It is a stand-alone page which, for the SEBoK, will provide content, related topics, and citations and identify primary references and key terms. An article will also provide the community with the ability to comment on

content. Articles are related to the SEBoK structure in the following ways (See Appendix E for further clarification):

- a. **Parts.** Each part will have *one* introductory article. This article will explain what the part is, the rationale for including the part, and will provide linkages to the KAs contained within that part.
- b. **KAs.** Each KA will have *one* introductory article. This article will explain what the KA is, the rationale for including the KA, and will provide linkages to the topics contained within that KA.
- c. **Topics.** The topic is essentially the “basic unit” of the SEBoK. Each topic will be contained within *one* article. Topics may have several subsections.
- d. **Sub-topics.** It is possible that some topics may need to be further broken down into sub-topics. When this occurs, the parent topic article will be formatted in the same ways as introductory articles for Parts and KAs: the article will introduce, define, and position the topic, then point to individual articles for each sub-topic. For SEBoK 0.5, it is assumed that there will be a small number of topics divided into sub-topics.
- e. **Glossary Terms.** In addition to content articles, the SEBoK will also contain an article (unique page) for the key terms identified by the authors. Each page will contain the glossary term and definition(s), references for the definition(s), and a discussion of the rationale behind the definition.

For SEBoK 0.5, Nicole Hutchison will create pages and compile potential definitions based on the materials in SEBoK 0.25 and using SEVocab (www.computer.org/sevocab). Authors will provide feedback on the definitions using the discussion threads. This information will be collected and time will be set aside at Workshop VII to work on consensus of the glossary terms.

- f. **Primary References.** In addition to content articles, the SEBoK will also contain an article (unique page) for primary references as identified by the authors. Each page will contain the bibliographic information for the primary reference as well as a short (3 paragraph max) annotation. Annotations should include why the reference is important and what a SEBoK user can expect to get out of the reference.
2. **SEBoK Size.** Because the SEBoK is anticipated to be in a wiki platform, it is difficult to define size parameters. The authors developed two guidelines (one bottom-up and one top-down) to help constrain the size for SEBoK 0.5 and keep it manageable:
 - a. **Article Length.** *Articles are expected to be 1750 words or less.* This is the size for the body of the article and does not include citations, figures, captions, tables, etc. This equates to approximately 4-5 pages of text. All articles are expected to fall within this range for 0.5 and can be shorter. This will help ensure that content is manageable and

will also enforce the concept of referencing information in lieu of recreating it. (In keeping with SEBoK being a Guide to the Body of Knowledge and not a compilation of the body of knowledge.)

- b. **Total Size.** The SEBoK is expected to have approximately 200 articles, with the expectation that total text (exclusive of figures, glossary, references) would total no more than about 400 pages in a traditional document. The estimated breakdown for 0.5 was that the text equivalents would be approximately 20 pages for Part 1; 80 for Part 2; 200 for Part 3; 60 for Part 3; and 40 for Part 5. Again, this is an overarching goal, which will be influenced by the maximum article lengths described in item a (above).
3. **Configuration Management.** Because this is a body of knowledge, it is critical that overarching structure be maintained even in the wiki environment. To this end, the wiki team will develop the SEBoK article structure (placeholders based on the outlines). Each author will then be able to pull up the placeholder(s) for his or her article(s) and insert content. All authors at Workshop VI have agreed to this process.
 - a. **Baseline.** The baseline structure will be confirmed within a week of BKCASE Workshop VI, and will be based on the outlines provided by the part teams.
 - b. **Alterations.** Once the baseline is established, any author requesting a change must go through a configuration management process. The author will present his or her ideas to the Part Team Lead (PTL). If the PTL agrees, he or she will then submit a change request form (see Appendix E). This form will document the desired change and the rationale. A council of the PTLs and the core team will review the request and make a decision with 48 hours of submission. If the change is accepted, the wiki team will update the article structure as appropriate and the wider team will be notified.

3.2.3 Wiki Development Process/Timeline

The following is an outline of the major movements in wiki development going forward to SEBoK 0.5.

1. **WSVI-May 1: Wiki Environment Development.** The wiki team will work to update, format, and refine the wiki environment following WS VI. The team will also create the baseline article structure and develop guidance and tutorials to facilitate author team work in the Wiki.
2. **May 1-June 5: Initial Content Development.** On May 1, the authors will be given access to and editing rights in the Wiki environment. At this time, they will be able to begin inserting content into the article placeholders. Again, they will follow the configuration management process if changes to the article structure are needed. The wiki team will be available to assist with any issues and answer technical questions during this time. The PTLs will provide direction and support to any content related questions.
3. **June 6-10: Wiki IPR.** For the week prior to Workshop VII, authors will stop inserting information into the wiki environment (editing privileges will be suspended). During this week, teams will

focus on identifying any major technical issues/challenges, any process issues/challenges, and providing feedback on whether the wiki approach is working. The wiki team will conduct a technical review to ensure that authors are appropriately following style and formatting guidance, linking between articles, etc.

4. **June 12-14: Workshop VII.** The author team will discuss and decide on needed refinements of the wiki process at the workshop.
5. **June 15-August 15: Final SEBoK 0.5 Content Development.** For the two months following WS VII, the authors will work on completing the content development for SEBoK 0.5. The idea is that all topics will have at least draft content by this time.
 - a. **August 1-15: SEBoK Article Approval.** The PTLs will be responsible for approving the content under their purview. From August 1-15, PTLs will focus on reviewing the articles created within their parts and “signing off” on them (this will utilize a wiki technology solution for documentation). Signing by a part team lead signifies that article content is ready for publication.
 - b. **June 15-August 1: IP/Copyright Permissions.** [Steph Enck](#) is the primary POC for IP/copyright issues. (Please see IP/Copyright briefing from Workshop VI on Sakai.) Authors are responsible for providing Steph with the copyright information for reuse of figures, tables, etc. as appropriate. Steph will work on following up with the publishers. *Please note: figures, tables, or other copyrighted information for which BKCASE does not have permission to use or permission pending will not be included in SEBoK 0.5.*
6. **August 1-September 10: SEBoK 0.5 Publication Preparation.** Beginning August 1, as articles are signed for approval, they will enter the publication process. This is a three-phase review:
 - a. **Content Review.** The Core team will be responsible for reviewing the content of all articles, as they were for reviewing all content of 0.25. The specific criteria used for content review have not yet been developed. *During this time, the Core team will also develop guidance for conducting reviews of the SEBoK and work on any remaining IP issues.*
 - b. **Technical Review.** The wiki team will be responsible for reviewing articles for technical issues (appropriate formatting, checking for broken links, etc.). The specific criteria used for technical review have not yet been developed.
 - c. **Technical Editing.** The tech editing team will be responsible for reviewing articles for appropriate grammar, spelling, consistency, etc. The specific criteria used for technical editing have not yet been developed.

The content review will lead the production process, but the technical review and technical editing can occur concurrently. When an article has been signed off on all three steps, it is ready for final publication.

7. **September 11-15: Finalization for Publication.** The wiki and Core teams will do any final clean up of the wiki necessary for publication. This will include removal of the signatures used for tracking, hiding of the “Edit” options on the wiki, including the Core team’s review guidance, and changing the wiki permissions from private to protected.
8. **September 15-December 15: SEBoK 0.5 Review.** The SEBoK 0.5 wiki will be released for review on 15 September 2011. It will be open for review until 15 December 2011.

An overview of the process steps/timeline can be seen in Figure 1, below:

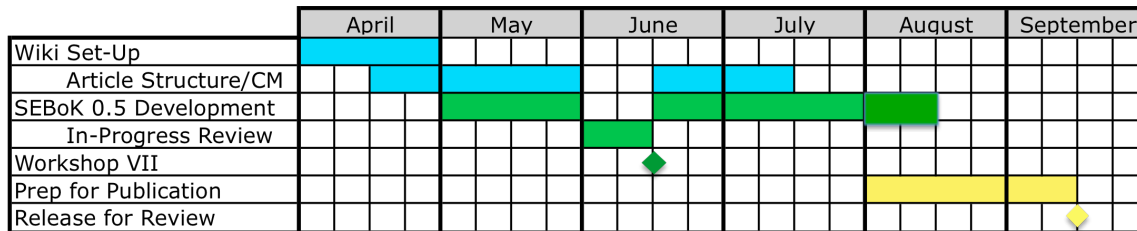


Figure 1. High level Gantt chart of SEBoK wiki development.

Wiki Action Items (From Workshop VI to Workshop VII)

1. Update and formatting of the wiki environment. *Wiki team*
2. Development of baseline article structure. *Wiki team* to draft structure; *PTLs* to confirm baseline.
3. Development/delivery of guidance on working in Wiki environment. *Wiki team*
4. Development of glossary and primary reference articles. *Nicole Hutchison*
5. Comment on compiled glossary information. *Part Teams/Leads*
6. Development of annotations for primary references. *Leads for each Topic/Knowledge Area*
7. Tracking of IP issues. *PTLs* to ensure IP provided; *Steph Enck* to track.

3.3 GRCSE 0.25 Review/Adjudication Discussion

Tim Ferris, the lead GRCSE author, provided an overview of the GRCSE 0.25 review comments, focusing on major issues that needed further discussion by the wider BKCASE author team.

3.3.1 Major Issues Identified in Reviews

The major issues identified by multiple reviewers, and the primary discussion points from Workshop VI are captured below.

1. **Global Applicability.** Many of the reviewers commented that GRCSE 0.25 seems to be very US-centric. Though the authors attempted to provide guidance that would be globally applicable, it

seems that many educational systems can not support the recommendations made in GRCSE. A primary example of this is in the realm of experience (see below). A primary goal of the project is for GRCSE to be globally applicable. The GRCSE team will pay particular attention to this going forward to version 0.5 and is also considering recruiting new authors who will help provide perspective on non-US educational systems.

2. **Experience.** GRCSE 0.25 recommended that students have at least two years of practical experiences upon entry to a graduate SE program (or that, if they did not, the program provide enough practical experience to make up for this). This was a contentious issue both within and outside the US. However, it indicates that many countries follow a different model of education and that, if GRCSE rigidly applies this model, it may not achieve its goal of global applicability. To address this, GRCSE will try to develop guidance on both of the major education/workforce development models the author team is aware of: undergraduate education followed immediately by graduate education versus undergraduate education followed by practical experience after which an individual enters a graduate program. (See section 3.2.2 below.)
3. **Defense/Aerospace Slant.** Several reviewers commented that GRCSE seemed to have a specific slant to the defense and aerospace industries. GRCSE is meant to apply to system-centric programs, meaning that it should be domain independent. Tim indicated that he believes this impression was given because the few examples cited in GRCSE 0.25 were from defense/aerospace-focused programs. Though the body explains that these are examples and that guidance is more generic, the team believes that by either removing these examples or providing a broader range of examples, this can be addressed.
4. **Degrees Required for Entry.** GRCSE 0.25 stated that an individual should have an undergraduate degree in mathematics, engineering, or the natural sciences. This was very contentious within the community. Many reviewers suggested that individuals with undergraduate degrees in the social sciences or with MBAs would be ideal candidates for a SE master's program. This led to discussion of a few overarching issues for GRCSE:
 - a. **Is a SE master's degree a true engineering degree?** The overwhelming response from the author team was that a SE master's degree is, first and foremost, an engineering degree. As such, it is necessary to have appropriate mathematical, scientific, and engineering background. Students without this would need additional information from the community.
 - b. **What is the actual prerequisite knowledge required for a SE master's program?** The authors debated the knowledge required on entering a SE master's program in order to be successful. Though there was not final consensus on this, the GRCSE team agreed that they would examine more closely what prerequisite knowledge was necessary upon entry; ways that this knowledge could be gained if students do not have it; and whether this knowledge can be tied to specific degrees, courses, etc. It was recognized

that in order to allow for different university entrance requirements, guidance on degree types or undergraduate courses would be most useful.

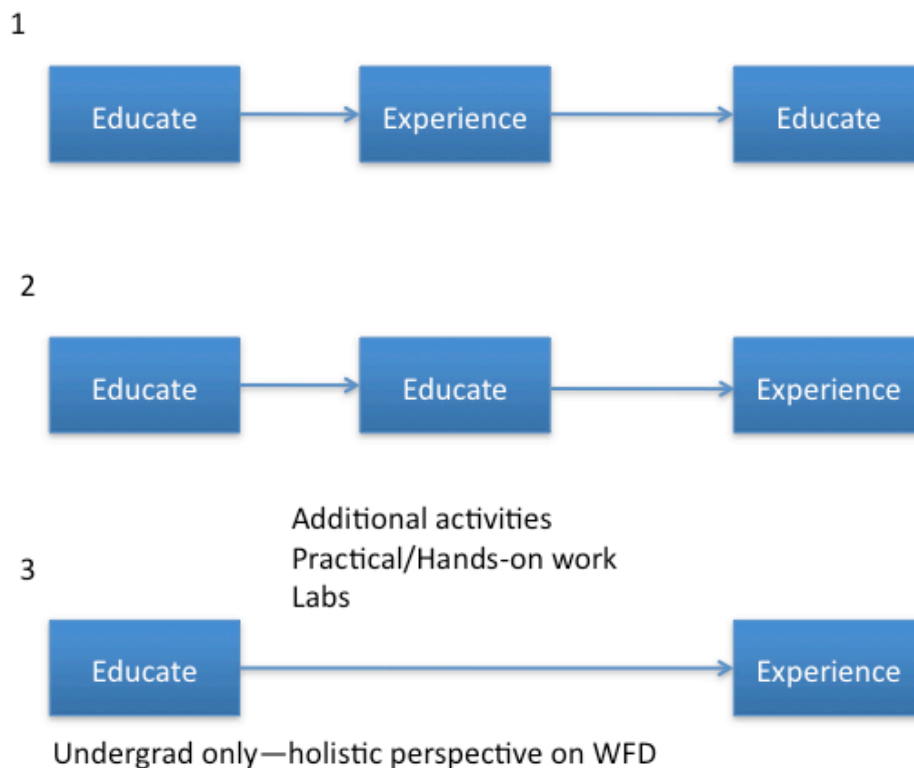
5. **Recommendations versus Requirements.** GRCSE is intended to be a set of recommendations and guidance principles for master's level SE education. It is not intended to be used as a standard and the BKCASE project will not try to use GRCSE for accreditation. This is stated in GRCSE. However, many reviewers felt that the guidance in GRCSE constituted "requirements"—things that must be implemented—in lieu of recommendations—best practices and suggestions for improving SE graduate education. The GRCSE team needs to be aware of this view and work to incorporate language reflecting recommendations throughout the document to alleviate confusion.
6. **Software.** GRCSE 0.25 included knowledge in the Core Body of Knowledge (CorBoK) which specifically reflected information from the SWEBOK. This raised two issues:
 - a. **Is there too much software engineering in GRCSE?** The sponsoring organization for BKCASE specifically funded development of a reference curriculum for SE that incorporates the right amount of SwE. In addition to that, the authors believe that because software is pervasive in most engineered systems, aspects of SwE that will impact the development of a system are important for a SE master's program to note. The exact balance of materials has not been determined, but the GRCSE team will work this issue and provide a recommendation at Workshop VII. In general, the GRCSE team will look to the SEBoK 0.5 to highlight software-specific information relevant for SE.
 - b. **Are there other disciplines that should be included?** Several reviewers indicated that if SwE knowledge were necessary, knowledge of other fields might also be appropriate. For example, mechanical engineering, industrial engineering, hardware development, and project management were all put forward by reviewers for inclusion. Again, the author team did not come to consensus on this issue, but the GRCSE team will provide a recommendation at Workshop VII.
7. **Curriculum Architecture/CorBoK.** There was confusion among some reviewers about the curriculum architecture of GRCSE 0.25, particularly the core extensions, which define knowledge which should be consistent for individuals acting in a specific role. There were two major concerns. The first was whether these two roles, Systems Designer/Developer (SDD) and Technical Manager (TM) were the "right" ones and whether there were others that should be included. The GRCSE team postulated these roles/core extensions as an example of how extensions could be used. They were not intended to be comprehensive in 0.25. The team agreed that additional roles should be considered. In the conversation, the author team also brought up the possibility of reflecting the differences in SE that focus on products versus services or enterprises (the PSE issues discussed for SEBoK, above). This may be another way of structuring the core extensions. The author team did not come to consensus on this, but the GRCSE team will provide a recommendation at Workshop VII. The second major concern that

the team noted that in future versions of the CorBoK, the use of Bloom’s levels may be less confusing to readers than the “check the box” method used in 0.25. To test this, the GRCSE team developed Bloom’s level recommendation for a subset of the CorBoK during the workshop and they believe that this will be possible and enlightening to readers.

8. **Examples and “How To”.** Some reviewers of GRCSE 0.25 suggested that it would be useful to have guidance on how to use GRCSE and examples of how different aspects of the curriculum might be implemented. The author team agreed that this would be useful to include. The GRCSE team will provide recommendations on how to address this at Workshop VII.

3.3.2 Plan from Workshop VI to Workshop VII

The GRCSE team, as discussed above, will develop a set of recommendations on how to deal with the major issues resulting from the GRCSE 0.25 review and present these recommendations at Workshop VII. One of the primary issues they will deal with, though, is the incorporation of different workforce development/educational models in order to make GRCSE more globally applicable. Moving forward, the GRCSE team will take a newer approach and frame the discussion as shown in Figure 2:



The concept is that there are two overarching approaches to graduate education. In the first example, the workforce completes undergraduate education, gains experience, and then pursues graduate education. In the second example, individuals complete undergraduate and graduate education before entering the workforce. For completeness of discussion, the GRCSE team has also documented that

undergraduate education followed by experience is also a valid workforce development option. However, only examples 1 and 2 will be relevant to GRCSE.

The team believes that these two models adequately cover the majority of ways graduate education may be approached. They believe that there will be implications for both models throughout the various aspects of GRCSE. Instead of developing two separate documents, however, the team will attempt to identify commonalities in curricula addressing each, and then highlight how each model will impact the different areas of the curriculum. For example, an objective may be attained by a graduate student with experience upon or shortly after graduation, while a student without practical experience will not be expected to achieve the same outcome until they have some experience.

The GRCSE team will determine the best way to address and provide recommendations at Workshop VII.

GRCSE Action Items (through Workshop VII)

1. Resolution of the primary/global issues raised by the review comments and development of recommendations for delivery at Workshop VII. *GRCSE team*
2. Adjudication of the GRCSE 0.25 review comments. *GRCSE team*
3. Update GRCSE materials to reflect review comments from the workshop, with the exception of the CorBoK, which must be delayed until SEBoK 0.5 is more mature. *GRCSE team*

4. Way Ahead

4.1 Future Workshops

It should be noted that the author team agreed at Workshop VI that Workshops VII and VIII should be three-day sessions, with two days for traditional workshop and one day for break-out work sessions.

- **Workshop VII: June 14-16, 2011.** Denver, CO, USA, in conjunction with the INCOSE International Symposium.
- **Workshop VIII: October 11-13, 2011.** London, England, hosted by Cranfield University. (Please note, dates and location need to be confirmed).
- **Workshop IX: January 24-26, 2012.** Jacksonville, FL, USA, in conjunction with the INCOSE International Workshop. (location tentative)
- **Workshop X: March 2012.** Missouri University of Science and Technology, Rolla, MO, in conjunction with the Conference on Systems Engineering Research (CSER) – March 19-22, 2012. (tentative)
- **Workshop XI: Summer 2012.** Rome, Italy, in conjunction with the INCOSE International Symposium and the European Conference on Systems Engineering (EUSEC).

4.2 BKCASE Publications and Outreach

Alice Squires provided an overview of the BKCASE outreach activities (including journal and conference papers, conference presentations, etc.) conducted since BKCASE Workshop V, and the possible activities for 2011. She encouraged all authors to consider participating in or taking ownership of at least one outreach opportunity.

2011 outreach opportunities include:

1. SSTC: May 16-19, Salt Lake City, Utah – paper/pres, paper due
2. IEEE-CSEE&T: May 22-24, 2011, Waikiki, Honolulu, Hawaii – a panel
3. INCOSE IS: June 20-23, 2011, Denver, CO – multiple panels
4. ASEE: June 26-29, 2011, Vancouver, BC, Canada – paper/pres, draft paper submitted and in review, final paper due March 11th
5. IEEE SoSE: June 27-30, 2011, Albuquerque, New Mexico – Garry Roedler attending and planned to hold BKCASE related activity
6. DOD SE Forum – TBD – BKCASE activities anticipated.
7. APCOSE: Oct 19-21, Seoul, South Korea – TBD – Tim Ferris and Jean-Claude expressed interest
8. NDIA: Oct 24-27, San Diego, CA – TBD – BKCASE activities anticipated.

For areas where the author team would simply like to provide a briefing on BKCASE to a specific audience, or would like to take ownership of an outreach activity, the author team is encouraged to:

1. Notify the core team (bkcase@stevens.edu) of any outreach opportunity that you choose to pursue (presentation, conference proceeding, journal article) in support of BKCASE. Please provide the conference or publication medium and the title of the presentation or article.
2. Once the event is complete, lead author should please provide a copy of your briefing or publication to the Core Team (bkcase@stevens.edu) that can be posted on Sakai or possibly used in future updates of the generic slide deck.
3. Utilize the generic slide deck, which is found on Sakai and which is periodically updated by the Core Team.

Appendix A: Meeting Participants

In Attendance

Rick Adcock, *Cranfield University/INCOSE* (UK)
James Anthony, *OSD, ATL Contract Support* (USA)
Barry Boehm, *University of Southern California* (USA)
John Brackett, *Boston University* (USA)
Ed Conrow, *Management and Technology Associates* (USA)
Cihan Dagli, *Missouri University of Science and Technology* (USA)
Heidi Davidz, *UTC Pratt & Whitney* (USA)
J.J. Ekstrom, *Brigham young University* (USA)
Marcia Enos, *Lockheed Martin* (USA)
Dick Fairley, *BKCASE IEEE Computer Society Representative*
Alain Faisandier, *Association Francaise d'Ingenierie Systeme/French INCOSE Chapter* (France)
Tim Ferris, *INCOSE/University of South Australia* (Australia)
Kevin Forsberg, *INCOSE* (USA)
G. Richard Freeman, *Air Force Center for Systems Engineering, Air Force Institute of Technology (AFIT)* (USA)
Tom Hilburn, *Embry Riddle Aeronautical University* (USA)
Nicole Hutchison, *Stevens Institute of Technology* (USA)
Beola Lenard, *Stevens Institute of Technology* (Support Staff) (USA)
Ray Madachy, *Naval Postgraduate School* (USA)
David Olwell, *Naval Postgraduate School* (USA)
Ken Niddifer, *Software Engineering Institute, Carnegie Mellon University* (USA)
Daniel Prun, *Ecole Nationale de l'Aviation Civile (ENAC) -French Civil Aviation University* (France)
Art Pyster, *Stevens Institute of Technology* (USA)
Jean-Claude Roussel, *European Aeronautical Defence and Space Company* (France)
Garry Roedler, *Lockheed Martin* (USA)
John Snoderly, *Defense Acquisition University* (USA)
Alice Squires, *Stevens Institute of Technology* (USA)
Massood Towhidnejad, *Embry-Riddle Aeronautical University (ERAU)*
Brian Wells, *Raytheon* (USA)

Joining via WebEx

Paul Croll, *CSC* (USA)
Stephanie Enck, *Naval Postgraduate School* (Support Staff) (USA)
Sandy Friedenthal, *new affiliation* (USA)
Scott Jackson, *University of Southern California* (USA)
Bud Lawson, *Lawson Konsult AB* (Sweden)
Linda Nozick, *Columbia University* (USA)
Richard Rosenthal, *TASC* (USA)

Appendix B: Meeting Agenda

Tuesday, April 12, 2011

Closed Session

7:30 am – Part Team Leads/Core Team Discussion

Plenary

9:00 am – Opening Remarks/Agenda Review – *Art Pyster*

10:00 am – Part 1 Overview – *Barry Boehm*

10:30 am – Part 2 Overview – *Rick Adcock*

11:00 am – Part 3 Overview – *Garry Roedler*

11:30 am – Part 4 Overview – *Art Pyster*

12:00 pm – Part 5 Overview – *Heidi Davidz*

1:00 pm – Review of Overarching SEBoK Strategy, Organization, etc. – led by *Art Pyster*

2:00 pm – Wiki Demonstration, CONOPS, Recommended Way Ahead – *Nicole Hutchison*

3:15 pm – Wiki Demonstration (cont.) – *Nicole Hutchison*

4:00 pm – Handling of Terminology & References for SEBoK – *Nicole Hutchison*

4:45 pm – Wrap Up – *Art Pyster*

5:00 pm – Adjourn

Wednesday, April 13, 2011

8:00 am – Review of Day 1 – *Dave Olwell*

8:30 am – Finalization of SEBoK 0.5 Way Ahead (incorporating Wiki) – led by *Art Pyster*

9:30 am – Close-out on any remaining actions from Day 1 – led by *Art Pyster*

10:15 am – Overview of GRSCE 0.25 Review Comments – led by *Tim Ferris*

11:30 pm – Overview of GRCSE 0.25 Review Comments (cont) – led by *Tim Ferris*

1:30 pm – GRCSE Way Ahead (to WS VII) – led by *Tim Ferris*

2:30 pm – BKCASE Staffing Plan for 2011 – led by *Dave Olwell*

3:00 pm – Overview of BKCASE schedule for 2011 and Beyond – led by *Art Pyster*

4:00 pm – Planning for Day 3 Breakout Sessions (Process/Deliverables) – led by *Alice Squires*

5:00 pm – Adjourn

Thursday, April 14, 2011

Plenary

8:00 am – Day 2 Recap – *Dave Olwell*

8:15 am – Discussion of IP/Copyright Permissions for 0.5 Products – *Steph Enck*

8:45 am – Communication and Outreach Discussion – *Alice Squires*

9:15 am – Review of Plan for Breakout Sessions – *Art Pyster*

Part Teams:

9:30 am – Individual working sessions

2:30 pm – Break for Final Plenary

Plenary

2:45 pm – Part Team Day 3 Recaps

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2:45 – Part 1 – *Barry Boehm*

2:50 – Part 2 – *Rick Adock*

2:55 – Part 3 – *Garry Roedler*

3:00 – Part 4 – *Art Pyster*

3:05 – Part 5 – *Heidi Davidz*

3:10 – GRCSE – *Tim Ferris*

3:10 pm – Final Plenary Session and Workshop Wrap-Up – *Art Pyster*

3:30 pm – Adjourn

Appendix C: Current Outline of SEBoK 0.5

The outline of the SEBoK is current at of April 28th, 2011. It was updated after the workshop and, for documentation, the most current outline has been included in this report.

- 0.0 [SEBoK Main Page]
- 1.0 SEBoK Introduction
 - 1.1 SEBoK Motivation, Context, Purpose, and Scope
 - 1.1.1 SEBoK Motivation and Context
 - 1.1.2 SEBoK Purpose
 - 1.1.3 [SEBoK] Scope: SE Boundary and Environment
 - 1.2 Nature of Systems, Engineered Systems, and SE
 - 1.2.1 Natural and Engineered Systems
 - 1.2.2 Systems Engineering
 - 1.3 SE and Other Engineering Disciplines
 - 1.4 Short History of SE
 - 1.4.1 Systems Engineering and Other Engineering Disciplines
 - 1.4.2 Systems Engineering Stakeholders and Use Cases
 - 1.5 Key SE Principles and Practices
 - 1.6 SEBoK Origins, Users, and Use Cases
 - 1.7 SEBoK Content and Organization
 - 1.8 [SEBoK] Operational Concept and Evolution
- 2.0 Systems
 - 2.1 Systems Overview
 - 2.1.1 What is a System?
 - 2.1.2 System Context
 - 2.1.3 Overview of System Science
 - 2.1.4 System Perspectives
 - 2.2 System Principles
 - 2.2.1 Principle of Holism
 - 2.2.2 Principle of Grouping
 - 2.2.3 Principle of Functions
 - 2.2.4 Principle of Interactions
 - 2.2.5 Principle of Boundaries
 - 2.2.6 Principle of Cohesion
 - 2.2.7 Principle of Emergence
 - 2.2.8 Principle of Additional Principles
 - 2.3 Types of Systems
 - 2.3.1 Classifications of Systems
 - 2.3.2 Engineered Systems
 - 2.3.3 Groupings of Systems
 - 2.3.4 System Domains
 - 2.4 Representing Systems with Models
 - 2.4.1 What is a model?
 - 2.4.2 Why model?
 - 2.4.3 Types of Models
 - 2.4.4 Representing Systems with a System Model

- 2.4.5 Modeling Standards
- 2.5 Systems Approach
 - 2.5.1 Establishing Stakeholder Value
 - 2.5.2 Identification of the Elements of a System
 - 2.5.3 Grouping of Elements
 - 2.5.4 Identification of the Boundary of a System
 - 2.5.5 Identification of the Function of Each Element
 - 2.5.6 Identification of the Interactions among Elements
 - 2.5.7 Synthesis of the System
 - 2.5.8 Proving the System
 - 2.5.9 Incremental Problem Resolution
- 2.6 Systems Engineering Challenges
 - 2.6.1 Complex System Architecting Challenges
 - 2.6.2 Attributes of Complex System Architectures
 - 2.6.3 Dynamically Changing Meta-Architectures
 - 2.6.4 Interoperability and Network Centric Architectures
 - 2.6.5 Evolutionary System Architecting
 - 2.6.6 Executable Architectures
- 3.0 Systems Engineering and Management
 - 3.1 Enterprise
 - 3.1.1 Enterprise Systems Engineering
 - 3.1.2 ESE Process Activities
 - 3.1.3 Enterprise Capability Management
 - 3.1.4 The Enterprise as a System
 - 3.1.5 Related Business Activities
 - 3.2 Live Cycle Models
 - 3.2.1 Life Cycle Characteristics
 - 3.2.2 System Life Cycle Process Drivers and Choices
 - 3.2.3 Representative System Life Cycle Process Models
 - 3.3 System Definition
 - 3.3.1 Stakeholders Requirements
 - 3.3.2 System Requirements
 - 3.3.3 Architectural Design
 - 3.3.4 Systems Architecting vs. Design?
 - 3.3.5 System Analysis
 - 3.4 System Realization
 - 3.4.1 [System] Implementation
 - 3.4.2 System Integration
 - 3.4.3 System Verification
 - 3.4.4 System Validation
 - 3.5 System Deployment and Use
 - 3.5.1 System Deployment
 - 3.5.2 Operation of the System
 - 3.5.3 System Maintenance
 - 3.5.4 Logistics
 - 3.6 Systems Engineering Management
 - 3.6.1 Planning
 - 3.6.2 Assessment and Control

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- 3.6.3 Risk Management
- 3.6.4 Measurement
- 3.6.5 Decision Management
- 3.6.6 Configuration Management
- 3.6.7 Information Management
- 3.6.8 Quality Management (from old chapter 14)
- 3.7 Product and Service Life Management
 - 3.7.1 Service Life Extension
 - 3.7.2 Capability Updates, Upgrades, and Modernization
 - 3.7.3 Disposal and Retirement
- 3.8 Specialty Engineering
 - 3.8.1 Integration of Specialty Engineering
 - 3.8.2 Human System Integration
 - 3.8.2.1 Environment
 - 3.8.2.2 Personnel (aptitude) / Manpower (quantity)
 - 3.8.2.3 Training
 - 3.8.2.4 Human Factors
 - 3.8.2.5 Occupational Health
 - 3.8.2.6 Habitability
 - 3.8.2.7 Human Survivability
 - 3.8.3 Dependability
 - 3.8.3.1 Safety
 - 3.8.3.2 Reliability and Maintainability
 - 3.8.3.3 Availability (NEW)
 - 3.8.3.4 Supportability (including logistics)
 - 3.8.4 Robustness
 - 3.8.4.1 Adaptability
 - 3.8.4.2 Resilience
 - 3.8.5 System Assurance
 - 3.8.5.1 Security (physical and information)
 - 3.8.5.2 Supply Chain Risk Mgt
 - 3.8.6 Spectrum Supportability
 - 3.8.6.1 Spectrum Management
 - 3.8.6.2 Electro-Magnetic Interference / Electro-Magnetic Compatibility
 - 3.8.7 Producibility
 - 3.8.7.1 Transportability
 - 3.8.7.2 Packaging
 - 3.8.7.3 Feasible shipping modes
- 3.9 System of Systems (SoS)
 - 3.9.1 TBD SoS Topic 1
 - 3.9.2 TBD SoS Topic 2
- 3.10 SE Standards
 - 3.10.1 Relevant Standards [for Systems Engineering]
 - 3.10.2 Alignment and Comparison of the Standards
 - 3.10.3 Application of SE Standards
- 4.0 Organizing to Perform Systems Engineering
 - 4.1 Strategy to Organize to Perform Systems Engineering
 - 4.1.1 Value Proposition to Perform Systems Engineering

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- 4.1.2 Governing Systems Engineering
- 4.2 Organizing Individuals to Perform Systems Engineering
 - 4.2.1 Personal Systems Engineering Competencies and Performance
 - 4.2.2 Personal Systems Engineering Development
 - 4.2.3 Ethical Systems Engineering
- 4.3 Organizing Teams, Projects and Programs to Perform Systems Engineering
 - 4.3.1 Structuring Teams, Projects, and Programs to Perform Systems Engineering Activities
 - 4.3.2 Determining Needed Systems Engineering Capabilities and the Resulting Influences on Organizing Teams, Projects, and Programs
 - 4.3.3 Developing and Improving Systems Engineering Capabilities Within Teams, Projects, and Programs
- 4.4 Organizing Businesses and Enterprises to Perform Systems Engineering
 - 4.4.1 Structuring Businesses and Enterprises to Perform Systems Engineering Activities
 - 4.4.2 Deciding Desired Systems Engineering Capabilities within Businesses and Enterprises
 - 4.4.3 Developing and Improving Systems Engineering Capabilities within Bes
- 5.0 Systems Engineering Implementation Examples
 - 5.1 Matrix of Implementation Examples
 - 5.2 Case Studies
 - 5.2.1 Case Study 1
 - 5.2.2 Case Study 2
 - 5.2.3 Case Study 3
 - 5.2.4 Case Study 4
 - 5.2.5 Case Study 5
 - 5.2.6 Case Study 6
 - 5.2.7 Case Study 7
 - 5.2.8 Case Study 8
 - 5.2.9 Case Study 9
 - 5.2.10 Case Study 10
 - 5.2 Vignettes

Appendix D: Staffing Matrix

A draft staffing matrix was completed at the close of Workshop VI. It has been revised since the workshop and is current as of April 30, 2011. Changes to the staffing are inevitable as the project moves forward; they will be updated and maintained by the Core Team.

Names in **Red** font denote authors who do not currently have authoring assignments.

Names in **Blue** denote potential authors pending approval or a commitment.

BKCASE Authors	SEBoK 0.5				GRCSE	
	Role	Part	Knowledge Area(s)	Topic(s)	Role	Chapter
Rick Adcock	Part 2 Lead	2	Overview of Systems, System Principles		author	3,4,6
Jim Anthony	author	4				
Erik Aslaksen	KA lead	2	Overview of Systems			
Richard Beasley	KA lead	4	Structure			
Johan Bendz	Pending?	3	Systems Definition	Part 3 KA –Sys. Def: Fundamentals, Architectural Design, Systems Architecting, Practical Considerations, System Req., Ref.		
Barry Boehm	Part 1 Lead	1,3	Part 1 Introduction, Part 3 Life Cycle Models, Part 3 SE Management	Part 3 KA –Life Cycle: Life cycle Process Drivers and Choices, Representative System Life cycle Process Models, Part 3 KA –SE Management: Planning, Risk Mgmt.		
Stuart Booth	author	3	Specialty Engineering	Part 3 KA –Specialty Engineering: Human SI		
John Brackett	author	5		Vignettes	author	5
Aaron Eng Seng Chia	author	5				
Edmund Conrow	author	3	SE Management	Part 3 KA –SE Management: Risk Mgmt.		
Paul Croll	KA lead	3	Specialty Engineering (Lead), SE Standards	Part 3 KA –Specialty Engineering: Intro, Integration of Special Eng., Producibility, Transportability, Practical Considerations, Ref., Glossary; Part 3 KA –SE Standards: Intro., Relevant Stand., Alignment and Comparison of Stand., Practical Consideration		

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BKCASE Authors	SEBoK 0.5				GRCSE	
	Role	Part	Knowledge Area(s)	Topic(s)	Role	Chapter
Cihan Dagli	KA lead	2,3	Part 2: Systems Engineering Challenges; Part 3: Specialty Engineering	Part 3 KA –Specialty Engineering: Intro, Integration of Special Eng., Producibility, Practical Considerations, Ref., Glossary		
Judith Dahmann	KA lead	3	System of Systems	Part 3 KA –SoS; Intro., XXX (TBD), Practical Considerations, Refs., Glossary		
Heidi Davidz	Part 5 Lead	4,5	Competencies; Introduction/ Matrix			
Dan DeLaurentis	author	3	System of Systems			
Jeremy Dick	author	3	Systems Definition	Part 3 KA –Sys. Def: Stakeholder Req., System Req., Practical Considerations, Ref.		
Charles Dickerson	author	3	System of Systems			
Joseph J. Ekstrom					author	6, App. B
Marcia Enos					author	4
Cheryl Jones	author	3	SE Management, Standards	Measurement, Risk Management, Requirements		
Dick Fairley	KA lead	3,4	Part 3 Life Cycle Models, Part 4 (KA Lead)	Part 3 KA -: Life cycle Process Drivers and Choices, Representative System Life cycle Process Models	author	5, 6
Alain Faisandier	KA lead	3	Life Cycle Models, System Definition (Lead?), Realization, SE Standards	Part 3 KA Life Cycle Models: Intro, LC Characteristics, Practical Considerations, Ref, Addt Ref, Glossary. Part 3 KA –Sys. Def: Intro, Fundamentals, Architectural Design, Systems Architecting, System Analysis, Stakeholder Req. Practical Considerations, Ref.; Part 3 KA – Realization: Fundamentals, Implementation, Sys. Integration, Sys. Verification; Part 3 KA – SE Standards: Intro., Relevant Stand., App of SE Stand., Practical Consideration		
Tim Ferris					GRCSE lead	1,2,3,6,8, App B

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BKCASE Authors	SEBoK 0.5				GRCSE	
	Role	Part	Knowledge Area(s)	Topic(s)	Role	Chapter
Kevin Forsberg	KA lead	3, 5	Part 3: Life Cycles (Lead), SE Management	Part 3 KA –Life Cycles: Intro, LC Characteristics, System Life cycle Process Drivers and Choices, Representative System Life cycle Process Models, Practical Considerations, Ref, Addt Ref, Glossary; Part 3 KA –SE Management: Decision Mgmt., Info. Mgmt.		
G. Richard Freeman	KA lead	2, 3, 5	Part 2 –Types of Systems; Part 3: -Enterprise (co-lead); 3-Enterprise Engineering (co lead), Part 3: Product and Service Life Management, Part 3: Specialty Engineering; 5-Global Positioning System	Part 3, KA -Enterprise: Intro, Enterprise Systems, ESE Process Activities, Enterprise Capability Management, Practical Considerations, Primary Ref., Addt Ref, Glossary; Part 3 KA –Product and Service Life Management: Intro, Fundamentals, Service Life Extension, Capability Updates/Upgrades/Modernization, Disposal/retirement; Part 3 KA –Specialty Engineering: Human SI, Dependability; Part 5: Case studies and vignettes;		
Sanford Friedenthal	KA Lead	2	Representing Systems with Models			
Brian Gallagher	KA lead	3	Deployment & Use (Lead)	Part 3 KA –Deploy & Use: Intro., Fundamentals, Sys. Deploy., Operation of Sys., Sys. Maintenance, Logistics, Practical Considerations, Ref., Glossary		
Michael Henshaw	KA lead	3	System of Systems (Lead)	Part 3 KA –SoS: Intro., XXX (TBD), Practical Considerations, Refs., Glossary		
Tom Hilburn	author	5	Primary References	Vignette	author	4, App A
Nicole Hutchison	Part 2 Core Team Rep	2	Part 2; SEBoK Glossary; SEBoK References	SEBoK Glossary; SEBoK References	author	1,2,4,6, App. A
Scott Jackson	KA lead	2, 3	Part 2: System Principles, Systems Approach; Part 3: Deployment and Use	Part 3 KA –Deploy & Use: Fundamentals, Sys. Deploy., Operation of Sys., Sys. Maintenance, Logistics, Practical Considerations, Ref., Glossary; Part 3 KA –Specialty Engineering: Dependability		

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	SEBoK 0.5				GRCSE	
BKCASE Authors	Role	Part	Knowledge Area(s)	Topic(s)	Role	Chapter
Mo Jamshidi	author	3	System of Systems	Part 3 KA –SoS: Intro., XXX (TBD), Practical Considerations, Refs., Glossary		
Naohiko Kohtake					author	5
Harold “Bud” Lawson	Part 3 Lead	3	Part 2: Systems Approach; Part 3: Life Cycles, SE Standards (Lead)	Part 3 KA –Life Cycles: Intro, Practical Considerations, Refs., Glossary; Part 3 KA –SE Standards: Intro., Relevant Stand., App of SE Stand., Practical Consideration, Refs, Glossary		
Yeaw lip “Alex” Lee	author	5				
David Long	Pending?	2	Representing Systems with Models			
Ray Madachy	KA lead	3	SE Management (Co-Lead)	Part 3 KA –SE Management: Intro., Assess and Control, Decision Mgmt., Config. Mgmt., Refs, Glossary		
James Martin	KA lead	3	Enterprise (Lead)	Part 3 KA -Enterprise: Into, Enterprise Systems, ESE Process Activities, Enterprise Capability Management, Practical Considerations, Primary Ref., Add Ref, Glossary		
Greg Mayhew						
William “Bill” Miller			Observer		Observer	
Andrew McGettrick			Observer		Observer	
Ken NiDiffer		3,4	SE Management	Part 3 KA –SE Management: Intro., Planning, Assess and Control, Risk Mgmt., Measure, Decision Mgmt., Config. Mgmt., Info. Mgmt., Quality Mgmt., Refs, Glossary; Part 3 KA – Specialty Engineering: Supportability (MAYBE?)		
Linda Nozick						
Dave Olwell	Part 3 Core Team Rep	3			author	6,7, App. D
Andy Pickard	Pending?	3				

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	SEBoK 0.5				GRCSE	
BKCASE Authors	Role	Part	Knowledge Area(s)	Topic(s)	Role	Chapter
Daniel Prun					author	7, App. D
Art Pyster	Part 4 Lead; Part 1 Core Team Rep	1,4	Strategy			
Garry Roedler	Part 3 Lead	3,4	Systems Definition (L?), SE Management (Co-Lead), SE Standards	Part 3 KA -Systems Def.: Intro, Stakeholder Req., Practical Considerations, System Req., Ref.; Part 3 KA –SE Management: Intro., Planning, Assess and Control, Measure, Info. Mgmt., Refs, Glossary; Part 3 KA –SE Standards: Intro., Relevant Stand., Alignment and Comparison of Standards, Practical Consideration, Refs, Glossary		
Richard Rosenthal						
Jean-Claude Roussel	KA lead	3	Systems Definition, Realization	Part 3 KA –Sys. Def: Fundamentals, Glossary. KA –Realization: Fundamentals, Implementation, Sys. Integration, Sys. Verification, Practical Considerations, Glossary		
Seiko Shirasaka					author	5
Bob Shishko	author	3	SE Management, Specialty Engineering	Part 3 KA -Logistics, Part 3 KA -Dependability/Supportability		
Hillary Sillitto	KA lead	3, 4	Interactions (Lead); Enterprise	Part 3 KA -Enterprise: Enterprise: Into, Enterprise Systems, ESE Process Activities, Enterprise Capability Management, Practical Considerations, Primary Ref., Add Ref, Glossary		
John Snoderly	KA lead	3	Realization (Lead?)	Part 3 KA -Realization: Intro, Fundamentals, Implementation, Sys. Integration, Sys. Verification, Practical Considerations, Ref., Glossary; Part 3 KA –Specialty Engineering: Intro, Integration of Special Eng., Human SI, Dependability, Sys. Assurance, Spectrum Supportability, Producibility, Transportability, Practical Considerations, Ref., Glossary		

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BKCASE Authors	SEBoK 0.5				GRCSE	
	Role	Part	Knowledge Area(s)	Topic(s)	Role	Chapter
Alice Squires	Part 4 Core Team Rep; Part 5 Core Team Rep	4,5	Organizational Learning; Hubble Space Telescope		author	6, App. E
Bill Stiffler	author	3	Product and Service Life Management	Part 3 KA –Product and Service Life Management: Intro, Fundamentals, Service Life Extension, Capability Updates/Upgrades/Modernization, Disposal/retirement,		
Massood Towhidnejad	author	3	Realization	Part 3 KA –Realization: Sys. Verification, Sys. Validation; Part 3 KA –SE Management: Quality Mgmt.	Chapter Lead	4
Guilherme Horta Travassos						
Ricardo Valerdi	author	3	SoS, SE Management	Part 3 KA –SE Management: Planning, Assess and Control		
Mary VanLeer					author	App. A
Qing Wang						
Brian Wells	KA lead	2,3	Part 2: Types of Systems; Part 3: Product and Service Life Management (Lead)	Part 3 KA –Product and Service Life Management: Intro, Fundamentals, Service Life Extension, Capability Updates/Upgrades/Modernization, Disposal/retirement, Practical Considerations, Ref., Glossary		

Appendix E: Wiki Mock-Up

E.1 Article Mock Up



- Part 1
- Part 2
- Part 1
 - KA 1
 - KA 2
 - Topic 1
 - Topic 2**
 - KA 3
- Part 4
- Part 5

Topic 2 (Article Title)

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Figure Caption

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Discussion Thread

Please provide any comments on Topic 2 below.

Comment Entry Area (access controls TBD)

Comment 1: User XXXXX
Body of Comment

Comment 2: User XXXX
Body of Comment

....

Related Topics

Topic 1

Topic 2

Topic 3

Topic 4

....

Citations

Citation 1

Citation 2

Citation 3

Citation 4

....

Related Primary References

[Reference 1](#)

[Reference 2](#)

....

Glossary

[Term 1](#)

[Term 2](#)

[Term 3](#)

[Term 4](#)

....

E.2 Glossary Mock-Up



Glossary "Article"



Glossary Home

- A H Q Y
- B I P W
- C J R X
- D K R Y
- E S Z
- F M T
- G N U

Search

Term

*Definition: Preferably a single definition, but if necessary, 2 definitions.
(Citation(s)—links to the references will be found at right)*

Discussion

This will be a discussion of the decision to utilize this definition for the term. If there are 2 definitions, it is critical to explain why it is impossible to select a single definition (for example, if the term was developed in emerging research and the community has not yet agreed to a definition).

Discussion should be no more than 1-2 paragraphs

Discussion Thread

Please provide any comments on Topic 2 below.

Comment Entry Area (access controls TBD)

Comment 1: User XXXXX
Body of Comment

Comment 2: User XXXX
Body of Comment

....

Related Terms

- Topic 1
- Topic 2
- Topic 3
- Topic 4

....

Articles Using Term

- Article 1
- Article 2
- Article 3
- Article 4

....

References

- [Reference 1](#)
- [Reference 2](#)

....

(these are the references cited in the definition)

E.3 Primary Reference Mock-Up



Primary Reference “Article”



Reference Home

- A H Q Y
- B I P W
- C J R X
- D K B Y
- E S Z
- F M I
- G N U

Search

Primary Reference*

Formatted citation for the reference (following the agreed-to BKCASE format, Chicago Manual of Style, 16th edition)

Discussion

This will be a discussion of the decision to utilize this reference and a short synopsis. Basically, why is this a primary reference? What subject(s) does it cover? Why was this reference chosen over others? What are the key benefits a BKCASE user will gain by reading this reference?

Discussion should be no more than 2-3 paragraphs

*We have to decide how we want to display the headings—author? Title?

Discussion Thread

Please provide any comments on Topic 2 below.

Comment Entry Area (access controls TBD)

Comment 1: User XXXXX
Body of Comment

Comment 2: User XXXX
Body of Comment

....

Related Terms*

- Topic 1
- Topic 2
- Topic 3
- Topic 4

....

*critical terms used in reference?

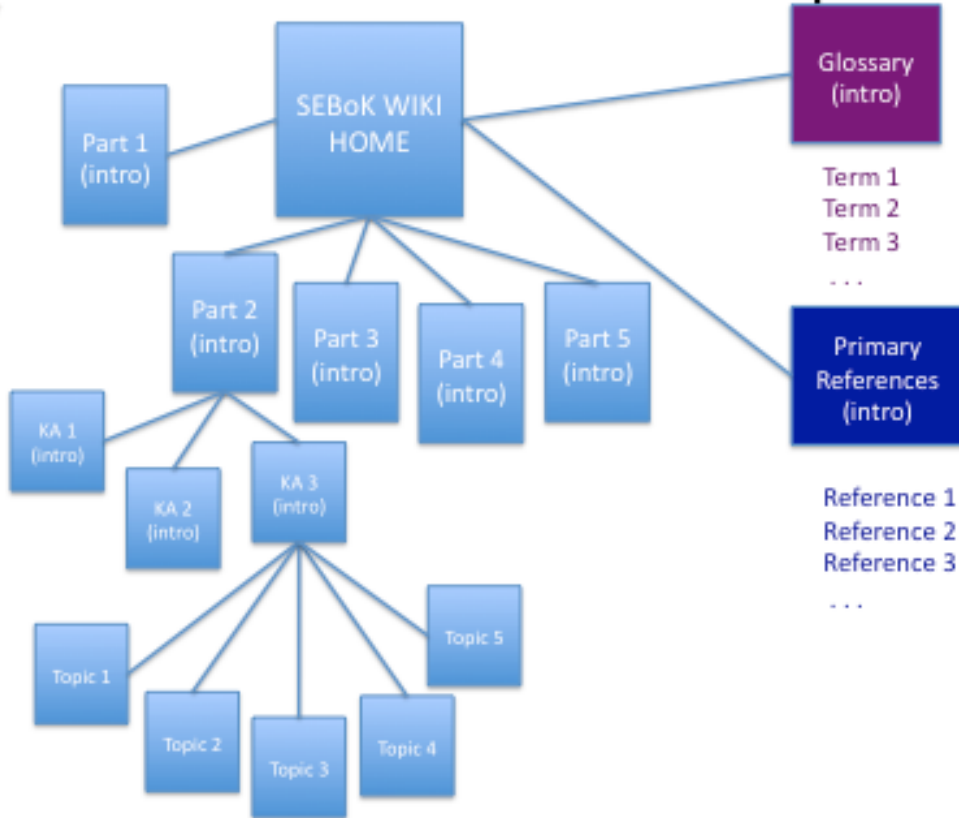
Articles Using Reference

- Article 1
- Article 2
- Article 3
- Article 4

....

E. 4 Article Concept

BKCASE™ Article Structure Concept



Appendix F: Primary Dates for BKCASE

May 16-19, 2011: 23rd Annual Systems and Software Technology Conference (SSTC), Salt Lake City, Utah
May 22-24, 2011: 24th IEEE-CS Conference on Software Engineering Education and Training, Waikiki, Honolulu, Hawaii
June 14-16, 2011: **BKCASE Workshop in Denver, CO**
June 20-23, 2011: INCOSE IS in Denver, Dates and Length TBD
June 26-29, 2011: ASEE Annual Conference in Vancouver, BC
June 27-30, 2011: IEEE SoSE, Albuquerque, New Mexico
August 1, 2011: All SEBoK 0.5 Materials Submitted to the Core Team
September 2011: Release of SEBoK 0.5 for review
October 11-13 2011: **BKCASE Workshop VIII in London**
Oct 19-21, 2011: 5th Asia-Pacific Conference on Systems Engineering (APCOSE 2011), Seoul, South Korea
October 24-27, 2011: NDIA 14th Annual SE Conference
December 2011: Release of GRCSE 0.5 for review
January 24-26, 2012: **BKCASE Workshop IX in Jacksonville, FL**
March 2012: BKCASE Workshop X in Missouri (Missouri University of Science and Technology)
Summer 2012: BKCASE Workshop XI in Rome, Italy
Summer 2012: INCOSE IS in Rome, Italy

Appendix G: Action Items

The following are major action items for the BKCASE author team through Workshop VI:

1. Begin documenting the actions resulting from the review comments in the adjudication matrices in preparation for WS VII. *Part Team Leads*
2. Complete and further refine the part outlines for the Baseline Structure by 30 April. *Part Teams/Leads*
3. Update and formatting of the wiki environment. *Wiki team*
4. Development of baseline article structure. *Wiki team* to draft structure; *PTLs* to confirm baseline.
5. Development/delivery of guidance on working in Wiki environment. *Wiki team*
6. Development of glossary and primary reference articles. *Nicole Hutchison*
7. Comment on compiled glossary information. *Part Teams/Leads*
8. Development of annotations for primary references. *Leads for each Topic/Knowledge Area*
9. Tracking of IP issues. *PTLs* to ensure IP provided; *Steph Enck* to track.
10. Resolution of the primary/global issues raised by the review comments and development of recommendations for delivery at Workshop VII. *GRCSE team*
11. Adjudication of the GRCSE 0.25 review comments. *GRCSE team*