8th Workshop on
SEBoK 0.5 Release/Way Ahead to
SEBoK 0.75
and
GRCSE 0.5 Way Ahead to Publication

October 11-13, 2011
University College London
London, UK

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 in the development of 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. At the second workshop in Daytona Beach, Florida in March 2010, the team expanded the SEBoK contents to include many other areas of systems engineering knowledge in addition to life cycle processes and identified the initial GRCSE team. The author team broke into subteams to begin drafting materials for review at the third Workshop. At the third workshop, held in conjunction with the INCOSE International Symposium, July 2010, the author team agreed to publication and review plans for SEBoK 0.25 and discussed the way ahead for development of a draft of GRCSE 0.25. The fourth workshop, held in Toulouse, France, was the first opportunity for authors to discuss the final release version of SEBoK 0.25 and for the authors to focus on preparing the release of GRCSE 0.25. GRCSE 0.25 was released for review on December 17, 2010. The fifth workshop, held in Phoenix, Arizona, focused on the review comments received on SEBoK 0.25 and the publication version of GRCSE 0.25. The sixth workshop, held in Los Angeles, California, focused on determining a way ahead for wiki implementation and examined the reviews of GRCSE 0.25. The seventh workshop, held in Denver, Colorado, focused on determining the publication plan for SEBoK 0.5 and developing the way ahead for GRCSE 0.5.

2. BKCASE Workshop VIII

The eighth workshop was held at the Radisson Grafton Hotel and the University College London in London, UK on October 11th through 13th, 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, then moved to breakout sessions for the part teams and GRCSE team to work issues independently, and concluded with final outbriefs in plenary.
The objectives of the workshop were:

1. To review and discuss what was released as SEBoK 0.5;
2. To examine author reactions and community comments received to date on SEBoK 0.5;
3. To define the strategy for SEBoK 0.75;
4. To review the draft version of GRCSE 0.5 materials (all but CorBoK, App C, E);
5. To review and refine the draft version of the GRCSE 0.5 CorBoK, with input from non-GRCSE authors;
6. To establish the way ahead for publication of GRCSE 0.5; and
7. To agree to the GRCSE 0.5 release criteria.

The authors believe that they fulfilled the objectives.

During Art Pyster’s introductory comments, he congratulated the group on the successful release of SEBoK 0.5 in the wiki environment. He explained that some extensive editing was required during the publication process and that there were still gaps that need an opportunity for review prior to the release of SEBoK version 1.0. Because of this, an interim SEBoK, version 0.75, was proposed and discussed during the workshop (please see below). Finally, Art reminded the authors that this was the last workshop before the release of GRCSE 0.5, making review of key elements of GRCSE a priority.

3. Workshop Proceedings

3.1 SEBoK 0.5 Release – Responses

SEBoK 0.5 was released for public review on September 19, 2011. Since the release, the website has seen a significant amount of traffic. At the time of the workshop, there had been approximately:

- 11,000 views of the main page (www.sebokwiki.org)
- 2,500 view of the SEBoK 0.5 Outline
- 2,000 views of the Part 1 article
- 2,500 views of the Part 2 article
- 2,000 views of the Part 3 Page
- 750 views of the Part 4 Page
- 1,500 views of the Part 5 Page
- 500 views of the Part 6 Page
- 1000 views of the Part 7 Page

The authors also reviewed the list of the most-visited topics.
3.1.2 Author Responses

There were mixed responses from the authors to version 0.5. In general, most authors were reasonably pleased with the overall wiki for the SEBoK. However, prior to the release of SEBoK 0.5, it was necessary to extensively update some articles as part of the Core team edit. Primarily, these edits were intended to make a more cohesive whole, with each article complying to the SEBoK strategy: short (~2000 words or less) articles which describe the general topic, representing the many views available in the body of knowledge, with appropriate pointers to the literature. For some articles, the required editing was somewhat drastic. Authors indicated that, while they understood the reason for the edits, the Core team edited these articles differently than the authors would have edited them. As part of the way ahead, these articles are to be addressed immediately, allowing the authors an opportunity to revise the content while maintaining the agreed-to guidance. (For more information, please see “SEBoK 0.75” below.)

In terms of the architecture, the general sense from the author team is that it is close to final. There are expected to be some changes in terms of adding or subtracting topics, and likely further restructuring in Part 6 as this part was the least mature. However, barring negative community feedback, the authors believe that the part structure will be maintained going forward and most of the KA structure and topic structure will be maintained. For more information, please see SEBoK 0.75 section 3.2 below.

In terms of integration, Sandy Friedenthal and Steve Mitchell developed a concept map of the SEBoK. This map was used in the 0.5 development process to help identify inconsistencies and gaps. An updated version of the concept map based on the release version of 0.5 was presented to the authors during the workshop. Sandy first provided an overview of the development process and the concept map in general. He then pointed out key inconsistencies and issues. Many of these issues are related to the key concepts of the SEBoK, the glossary terms, and how these are used across the SEBoK. The author team agreed that they would (a) continue to use the concept map to improve integration and (b) consider how aspects of the concept map may be presented in the next iteration of the SEBoK. Several authors also have the need to develop standardized definitions and ensure consistent use of terminology across the SEBoK.

Inconsistency in references was another discussion point for the authors. For example, some articles have upwards of 100 references, while others have 10 or fewer. While the SEBoK should reflect the existing BoK, the authors agreed that part of the service to the SE community is to provide some guidance on which sources to review. As such, the authors need to work to strengthen and, in some cases, broaden the references provided for articles.

Several authors also mentioned that they, or others they had spoken with, would like to have a downloadable copy of the SEBoK. They indicated there was frustration that it could only be used when internet access was available. The Core team has taken the action to develop a PDF version that can be posted to the wiki for download.
3.1.3 Reviewer Responses

There is a high level of Wiki traffic, but limited use of the response tools in place to provide reviewer feedback. The authors discussed the review process – a structured response to each wiki thread and any forms received – but did not discuss specifics of the few review comments that were topic focused.

In order to increase the reviewer response, the BKCASE wiki team will hold open WebEx sessions in November to provide an overview of the wiki and demonstrate the review process. These Webex sessions will be advertised through the professional societies, the author team and their affiliations, appropriate conferences and conference distributions and by other means as feasible.

3.1.3 Integration

As stated above, a consistent concern during the workshop was the ability of the author team to ensure appropriate consistency within and between the Parts going forward. The concept map for the SEBoK will be updated and used to provide a common reference for improving integration. Each Part Team Lead (PTL) will be responsible for ensuring integration within his/her part and will also raise any areas of potential concern to the integration team for their awareness.

<table>
<thead>
<tr>
<th>Integration Team</th>
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<tbody>
<tr>
<td>Co-Leads</td>
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<tr>
<td>Concept Map Developers</td>
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<tr>
<td>Members</td>
</tr>
</tbody>
</table>

**SEBoK Action Items:**

1. Develop an updated version of the SEBoK concept map, which will be used for integration. *Sandy Friedenthal and Steve Mitchell* to develop; the *Part Team Leads* to review and correct any noted inconsistencies/gaps.

2. Determine whether and how to incorporate some aspect of the concept map into the next iteration of the SEBoK. *Sandy Friedenthal* to lead.

3. Develop a PDF version of the SEBoK that can be posted to the wiki and downloaded.

### 3.2 SEBoK 0.75 – Concept and Way Ahead

Based on the published version of 0.5, the Core team believes that there are still enough immature or blank articles to require a limited round of reviews (after 0.5) before the publication of the final version of the SEBoK (1.0) for BKCASE.
The Core team proposed the development of SEBoK 0.75 – an interim version which would reflect updates of selected articles. The new release would develop content for currently blank articles, improve immature articles, and provide authors an opportunity to update articles that were heavily edited in preparation for SEBoK 0.5.

### 3.2.1 Articles to be Updated

During the workshop, the authors reviewed the final outline for SEBoK 0.5 ([www.sebokwiki.org/SEBoK_0.5_Outline](http://www.sebokwiki.org/SEBoK_0.5_Outline)). Based on the authors’ review of 0.5, they developed a short list of articles to be edited for SEBoK 0.75. This included minor modifications to the architecture – primarily splitting of some topics with considerable content, the addition of a few new topics, and restructuring of Part 6. The articles to be revised can be seen in Appendix C, along with the basic staffing.

The primary focus is on Part 3, which has a substantial amount of material, Part 6, which was the last part to be developed, and Part 4, which had one blank knowledge area in version 0.5. There are also minor updates in Parts 1, 2, and 5. It is estimated that 52 articles will be revised for version 0.75 (this is an estimate as some content is still TBD). Glossary and primary reference pages will be updated only for those pages related to the articles up for revision. It was agreed that Part 7 will not be edited for v0.75. These decisions will be revisited at Workshop IX.

### 3.2.2 Staffing

Because approximately 2/3 of the SEBoK will not be revised for version 0.75, the team reviewed staffing for SEBoK 0.75, allowing authors whose 0.5 articles are not being revised the opportunity to work on additional articles. The full staffing list can be found in Appendix D. Authors who did not attend the workshop are encouraged to review the list and contact the appropriate part team lead or core team members to volunteer for articles.

PTLs should provide updates to the staffing of their articles to the Core team as needed.

### 3.2.3 SEBoK 0.75 Way Ahead/Timeline

The general approach for SEBoK 0.75 is outlined below.

- Part Teams will begin drafting articles immediately after Workshop VIII
  - Initial work will be offline. A developmental version of the 0.75 wiki will be available as soon as possible. (This will be separate from the public version of 0.5 open now for review.)
  - Authors should be examining the comments for SEBoK 0.5 ([www.sebokwiki.org](http://www.sebokwiki.org)) as they refine materials for SEBoK 0.75.
• **January 17-19, 2012 – Workshop IX.** At Workshop IX the SEBoK 0.75 approach will be reviewed and revised as appropriate. Part Teams will continue working on selected articles after Workshop IX through February 5, 2012.

  o Integration work using the concept map will be conducted, but the precise dates for this are TBD.

• **February 6-12, 2012 – Internal Review.** Authors will finish drafts of SEBoK 0.75 articles on February 5. February 6-12, the wiki will be reviewed by the entire author team. (Specific assignments TBD).

• **February 13-19 – Final Author Editing.** Authors will have one week to examine the internal review comments and update their article(s) to reflect any final changes.

  o Final integration efforts will be conducted during this time. Exact process TBD.

• **February 20-March 14, 2012 – Preparation for Publication.** This phase includes Core team edit, technical editing, wiki technical review, and IP/copyright review, and testing of all wiki functionality.

  o At this time, the list of selected reviewers for version 0.75 will also be developed.

• **March 15, 2012 – Release.** SEBoK 0.75 should be released no later than March 15 for a 30-day limited review.

### 3.3.1 Status of Non-CorBoK GRCSE Elements

In general, the non-CorBoK elements of GRCSE are in near-final draft status. The front matter is believed to be in near-final status.
The Outcomes and Objectives have been extensively revised based on review comments. There are now only four (4) recommended general objectives and several examples of objectives from real programs have been provided. The outcomes have also been updated. One major change was to update the language related to required software engineering skills to reflect what systems engineers need to understand about software engineering; the previous version included “mastery” of software engineering.

The architecture is generally unchanged; however, the graphical representation of the architecture is undergoing revision based on the many helpful comments received by the author team.

The entrance expectations are primarily unchanged. However, the discussion about how entrance expectations relate to outcomes – and how different entrance characteristics might limit a student’s ability to reach those objectives – has been expanded.

The assessment materials (chapter 8 and appendix D) seem to be reasonably mature and discuss possible assessment techniques for certain levels of attainment. It was noted that assessment here refers to how well students achieve the given outcomes; it does not address assessment of the curriculum design. This is something that may be considered for the final version of GRCSE.

The appendices appear to be in reasonable shape with the exception of Appendix C which will be developed as the CorBoK becomes more mature. Appendix E is going through a re-write as well.

3.3.2 CorBoK Discussion

The Core Body of Knowledge (CorBoK) of GRCSE is based primarily on the SEBoK, with the understanding that it is possible for knowledge from other disciplines to be included. Prior to the workshop, the GRCSE team developed a draft of the CorBoK – primarily a listing of the key knowledge areas and most of the topics from the SEBoK that are believed to be important for all students. A subset of the GRCSE team with input from several SEBoK authors (to provide industry input) also provided recommendations on the attainment level (Bloom’s level) to which a student should know each element of the CorBoK. The input was based on members from around the world. This information was used as input to the plenary.

The time spent in the workshop plenary session was focused on getting recommendations from the authors on the appropriate Bloom’s level for each topic – both for the Foundation (the topics all master’s students must cover) as well as for the Concentrations (the topics that are specific to a particular role). Much discussion was spent on the meaning of the specific Bloom’s levels; the authors decided that a critical task for the GRCSE team was to develop clean/concise definitions for the Bloom’s levels that would allow them to achieve repeatable results. In addition, the authors recommended that the GRCSE team simplify the Bloom’s levels being used for the first pass. Instead of 1-6 (knowledge through evaluation), they recommended three groupings: 1 and 2 (combination of knowledge and comprehension), 3 and 4 (combination of application and analysis), and 5 and 6 (combination of synthesis and evaluation). The rationale for reducing to 3 levels is that the GRCSE team could likely reach more consistent results using this method and then focus on any required differentiation in a second pass.
Based on this guidance, the GRCSE team met during the working sessions on Day 3 and completed a more detailed review of the CorBoK. The team believes that they have an appropriate way ahead to finalize the CorBoK for GRCSE 0.5.

### 3.3.4 GRCSE 0.5 Release Criteria

The author team reviewed draft release criteria for GRCSE 0.5; these following criteria were agreed to. The Core team will use these criteria to ensure that GRCSE 0.5 is ready for release in December 2011.

1. All main body chapters (except CorBoK) are at about 70% maturity
2. CorBoK sufficiently mature for external review (including draft time allocation), anticipating significant change may be required before version 1.0
3. No blank appendices
4. Chapter leads agree their respective chapters are ready for release
5. GRCSE has gone through tech editing
6. Each image has a copyright release in hand or there is placeholder for image with pointer to another source if one exists
7. Integration threads between aspects of GRCSE (e.g. Entrance Expectations, Outcomes, CorBoK, etc.) are explained
8. General guidance on use of SEBoK in GRCSE context is explicitly included
9. Core Team believes GRCSE will be usable by *early adopters* – a “gestalt” perspective
10. Core Team agrees GRCSE is ready for release
11. Gang of 6 from BKCASE/INCOSE/IEEE agree there is nothing that would prohibit INCOSE/IEEE from becoming stewards after version 1.0 is released

### 3.3.4 GRCSE Staffing

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

<table>
<thead>
<tr>
<th>BKCASE Authors</th>
<th>GRCSE (Chapters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adcock, Rick</td>
<td>Author</td>
</tr>
<tr>
<td>Brackett, John</td>
<td>Author - Lead 6</td>
</tr>
<tr>
<td>Ekstrom, Joseph J.</td>
<td>Author - Lead App C</td>
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<tr>
<td>Ferris, Tim</td>
<td>GRCSE lead; Lead Preface/Chapter 1, 2, 9, App B</td>
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<tr>
<td>Hilburn, Tom</td>
<td>Author - Lead 5, App A, App E</td>
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<tr>
<td>Hutchison, Nicole</td>
<td>Author</td>
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<tr>
<td>Mitchell, Steve</td>
<td>Author</td>
</tr>
<tr>
<td>Olwell, Dave</td>
<td>Author - Lead 3</td>
</tr>
<tr>
<td>Prun, Daniel</td>
<td>Author - Lead 8, App D</td>
</tr>
<tr>
<td>Squires, Alice</td>
<td>Author - Lead 7</td>
</tr>
</tbody>
</table>
3.3.5 GRCSE Way Ahead/Timeline
The general timeline for release of GRCSE 0.5 is as follows:

- GRCSE authors draft materials through November 20, 2011.
- **November 21-29, 2011 – Core Team/Tech Edit.** First round of Core team review and technical editing.
- **November 30 – December 4, 2011 – GRCSE Team Review/Update.** The GRCSE team will have an opportunity to review the work done by the Core team.
- **December 5-12, 2011 – Core Team/Tech Edit.** Final preparations for publication.
- **December 15, 2011 – Release of GRCSE 0.5.** Release of GRCSE 0.5 for open review for 90 days.

4. Way Ahead

4.1 Future Workshops

It should be noted that the author team agreed Workshops IX, X, and XI should be 3-day sessions, with 2 days for traditional workshop and 1 day for break-out work sessions.

- **Workshop IX: January 17-19, 2012.** Daytona Beach, FL, USA, hosted by Embry-Riddle University. Scheduled immediately prior to the INCOSE International Workshop.
- **Workshop X: April 24-26, 2012.** Monterey, CA, USA, hosted by the Naval Postgraduate School. (Please refrain from booking travel until further notice. Location is subject to change and pending availability.)
- **Workshop XI: July 3-5, 2012.** Rome, Italy, in conjunction with the INCOSE International Symposium and the European Conference on Systems Engineering (EUSEC). (Details TBD)
- **Workshop XII: October, 2012.** Hoboken, NJ, USA, hosted by the Stevens Institute of Technology. This will be the final workshop of the BKCASE project.

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 the last workshop, the remaining activities for
2011, and upcoming deadlines for events in 2012. She encouraged all authors to consider participating in or taking ownership of at least one outreach opportunity.

**2011 remaining outreach opportunities include:**

1. APCOSE: Oct 19-21, Seoul, South Korea – Tim Ferris and Jean-Claude Roussel to present papers
2. NDIA: Oct 24-27, San Diego, CA – Submissions for a 3-presentation session on SEBoK and a GRCSE panel were made by the Core Team, Tim Ferris, and other BKCASE authors; waiting for response from NDIA.

All authors who submit papers or presentations on BKCASE should notify the Core Team at bkcase@stevens.edu and provide a copy of the final paper and/or presentation. 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, AT&L Contract Support (USA)
Barry Boehm, University of Southern California (USA)
Cihan Dagli, Missouri University of Science and Technology (USA)
J.J. Ekstrom, Brigham Young University (USA)
Stephanie Enck, Naval Postgraduate School (Support Staff) (USA)
Alain Faisandier, Association Francaise d’Ingenierie Systeme, MAP Systeme/French INCOSE Chapter (France)
Tim Ferris, INCOSE/University of South Australia (Australia)
Kevin Forsberg, INCOSE (USA)
Sandy Friedenthal, SAF Consulting (USA)
Tom Hilburn, Embry Riddle Aeronautical University (USA)
Nicole Hutchison, Stevens Institute of Technology (USA)
Bud Lawson, Lawson Konsult AB (Sweden)
Ray Madachy, Naval Postgraduate School (USA)
Steven Mitchell, Lockheed Martin (USA)
David Olwell, Naval Postgraduate School (USA)
Ricardo Pineda, University of Texas at El Paso (USA)
Daniel Prun, Ecole Nationale de l’Aviation Civile (ENAC) (France)
Art Pyster, Stevens Institute of Technology (USA)
Jean-Claude Roussel, European Aeronautical Defence and Space Company (France)
Garry Roedler, Lockheed Martin (USA)
Hillary Sillitto, Thales (UK)
Alice Squires, Stevens Institute of Technology (USA)
Massood Towhidnejad, Embry-Riddle Aeronautical University (ERAU)
Brian Wells, Raytheon (USA)

Joining via WebEx

None
Appendix B: Meeting Agenda

**Tuesday, October 11, 2011:**
8:30 am – Opening Remarks/Agenda Review – Art Pyster
9:00 am – Overview of SEBoK 0.5 – Art Pyster
9:30 am – Review of SEBoK 0.5 Concept Map – Sandy Friedenthal
10:45 am – Discussion of SEBoK 0.5 Reviews Received to Date – Nicole Hutchison
11:20 am – Discussion of Known SEBoK 0.5 Successes, Shortfalls, and Gaps
   11:20 am – Part 1 – Barry Boehm
   11:50 am – Part 2 – Rick Adcock
   12:20 pm – Part 3 – Garry Roedler
   12:40 pm – Part 4 – Bud Lawson
   1:00 pm – Part 5 – Art Pyster
   1:20 pm – Part 6 – Dave Olwell
   1:40 pm – Part 7 – Alice Squires
   2:00 pm – Wiki – Nicole Hutchison
2:20 pm – Overall Successes, Shortfalls, Gaps – Art Pyster
2:45 pm – Discussion of Adjudication Approach for SEBoK 0.5 – led by Nicole Hutchison
3:30 pm – Identify Way Ahead for SEBoK 0.75 (to Workshop IX) – Art Pyster
4:30 pm – Initial CorBoK Assessment – Tim Ferris
5:00 pm – Adjourn

**Wednesday, October 12, 2011**
9:00 am – Review of Day 1 – Dave Olwell
9:20 am – Resolution of Outstanding Day 1 Issues – led by Art Pyster
9:30 am – Review and Discussion of GRCSE 0.5 Draft Materials (non-CorBoK)
   9:30 am – Overview and Front Matter – Tim Ferris
   10:00 am – Objectives – Dave Olwell
   10:30 am – Outcomes/Use Cases – Massood Towhidnejad
   11:15 am – Entrance Expectations/Appendix E – Tom Hilburn
   11:45 am – Architecture – Alice Squires
   12:15 pm – Assessment – Daniel Prun
   12:45 pm – Other Appendix Overviews – Tim Ferris
1:00 pm – Review of Draft CorBoK and CorBoK Working Session – Tim Ferris
4:30 pm – Way Ahead for GRCSE 0.5 (to Publication) – led by Tim Ferris
5:00 pm – Adjourn

**Thursday, October 13, 2011**
*Plenary*
9:00 am – Review of Day 2 – Dave Olwell
9:30 am – Communication and Outreach – Alice Squires
9:45 am – Overview of Workshop IX Logistics – Steph Enck

*Breakout Sessions* - Working Sessions (CorBoK, SEBoK, and others TBA)
10:00 am – Begin Working Sessions
2:45 pm – Break for Final Plenary

*Plenary*
3:00 pm – Review of Working Session Progress
3:00 pm – CorBoK Update – Tim Ferris
3:30 pm – Update on other GRCSE Sections – Tim Ferris
3:45 pm – Closing Remarks – Art Pyster
4:00 pm – Adjourn
Appendix C: Outline of SEBoK 0.75 (end of Workshop VIII)

Below is the proposed work plan for SEBoK 0.75. Included are the staff against the articles to be updated, including any gaps.

Key
Grey = No Change
Blue = Topic to be Revised for 0.75
Red = New Topic for 0.75

<table>
<thead>
<tr>
<th>SEBoK 0.75 Article</th>
<th>Staffing</th>
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<tr>
<td><strong>Part 1: SEBoK 0.5 Introduction</strong></td>
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<td>Scope of the SEBoK</td>
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<td>Structure of the SEBoK</td>
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<td>Economic Value of Systems Engineering</td>
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**Part 2: Systems**

**Knowledge Area: Systems Overview**
- Topic: What is a System?
- Topic: System Context
- Topic: Overview of System Science
- Topic: Systems Thinking

**Knowledge Area: System Concepts**
- Topic: Overview of System Concepts
- Topic: Complexity
- Topic: Emergence

**Knowledge Area: Types of Systems**
- Topic: Classifications of Systems
- Topic: Groupings of Systems
- Topic: The Product View of Engineered Systems
- Topic: The Service View of Engineered Systems
- Topic: The Enterprise View of Engineered Systems
Knowledge Area: Representing Systems with Models

Topic: What is a Model?
Topic: Why Model?
Topic: Types of Models
Topic: System Modeling Concepts
Topic: Modeling Standards

Knowledge Area: Systems Approach

Topic: Overview of the Systems Approach
Topic: Exploring a Problem or Opportunity
Topic: Systems Analysis Approach
Topic: Synthesis of a System
Topic: Proving a System
Topic: Owning and Making Use of a System
Topic: Applying the Systems Approach

Knowledge Area: Systems Challenges

Topic: Complex System Challenges
Topic: Dynamically Changing Systems

Topic: Humans in Systems (to be finalized)

Part 3: Systems Engineering and Management

Knowledge Area: Life Cycle Models
Topic: Life Cycle Characteristics
Topic: System Life Cycle Process Drivers and Choices

Topic: Integration of Process and Product Models

Knowledge Area: System Definition

Topic: Fundamentals of System Definition
Topic: Mission Analysis and Stakeholders Requirements
Topic: Stakeholder Needs and Requirements
Topic: System Requirements

Topic: Architectural Design: Logical
Topic: Architectural Design: Physical

Topic: System Analysis

Knowledge Area: System Realization
BKCASE Workshop 8 Report

Topic: System Implementation
Topic: System Integration

**Topic: System Verification and Validation**

Garry, Alain, Jim, Jean-Claude

**Topic: System Validation**

Garry, Alain, Jim, Jean-Claude

**Knowledge Area: System Deployment and Use**

Topic: System Deployment

Garry, Jim, Mark Cecere
(Garry to contact), Bill Stiffler

**Topic: Operation of the System**

Garry, Jim, Mark Cecere
(Garry to contact), Bill Stiffler

**Knowledge Area: System Maintenance**

Garry, Jim, Mark Cecere
(Garry to contact), Bill Stiffler

**Knowledge Area: Logistics**

Garry, Jim, Mark Cecere
(Garry to contact), Bill Stiffler

**Knowledge Area: Systems Engineering Management**

**Topic: Planning**

Garry, Barry, Ray

Topic: Assessment and Control

Topic: Risk Management

Topic: Measurement

Topic: Decision Management

Topic: Configuration Management

Topic: Information Management

Topic: Quality Management

**Knowledge Area: Product and Service Life Management**

Topic: Service Life Extension

Topic: Capability Updates, Upgrades, and Modernization

Topic: Disposal and Retirement

**Knowledge Area: Systems Engineering Standards**

Topic: Relevant Standards

Topic: Alignment and Comparison of the Standards

**Knowledge Area: Application of Systems Engineering Standards**

**Part 4: Applications of Systems Engineering**

**Knowledge Area: Product Systems Engineering**

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto

Bud, Ricardo, Brian Wells, James Martin, Hillary Sillitto
Topic: TBD

Knowledge Area: Service Systems Engineering
- Topic: Service Systems Background
- Topic: Fundamentals of Services
- Topic: Properties of Services
- Topic: Scope of Service Systems Engineering
- Topic: Value of Service Systems Engineering
- Topic: Service Systems Engineering Stages

Knowledge Area: Enterprise Systems Engineering
- Topic: Enterprise Systems Engineering Background
- Topic: The Enterprise as a System
- Topic: Related Business Activities
- Topic: Enterprise Systems Engineering Key Concepts
- Topic: Enterprise Systems Engineering Process Activities
  - Topic: Enterprise Capability Management

Knowledge Area: Systems of Systems (SoS)
- Topic: Architecting Approaches for Systems of Systems
- Topic: Socio-Technical Features of Systems of Systems

Knowledge Area: Systems Engineering Organizational Strategy
- Topic: Organizational Purpose
- Topic: Value Proposition for Systems Engineering

Part 5: Enabling Systems Engineering

Knowledge Area: Enabling Businesses and Enterprises to Perform Systems Engineering
- Topic: Deciding on Desired Systems Engineering Capabilities within Businesses and Enterprises

Knowledge Area: Enabling Teams to Perform Systems Engineering
- Topic: Assessing Systems Engineering Performance of Business and Enterprises
- Topic: Developing Systems Engineering Capabilities within Businesses and Enterprises
- Topic: Culture
Part 6: Related Disciplines (New Title TBD)

**Knowledge Area: Systems Engineering and Software Engineering**

- Topic: The Nature of Software
- Topic: An Overview of the SWEBOK Guide
- Topic: Software Engineering and Systems Engineering: Similarities and Differences

**Knowledge Area: Systems Engineering and Project Management**

- Topic: An Overview of Project Management
- Topic: Systems Engineering and Project Management: Similarities and Differences

**Knowledge Area: Systems Engineering and Procurement/Acquisition**

**Knowledge Area: Systems Engineering and Marketing/Sales**

**Knowledge Area: Systems Engineering and Specialty Engineering**

- Topic: Integration of Specialty Engineering
- Topic: Reliability, Availability, and Maintainability

- Topic: Human Systems Integration
- Topic: Safety Engineering
  - **Topic: Security Engineering**
  - **Topic: System Assurance**
  - **Topic: Manufacturability**

Dave, Ricardo, Sandy, Barry
Dick, Dave, Art, Ken Nidiffer, Tom (reviewer)
Dick, Alice, Karl Best (possible), Brian G., Ken Nidiffer
Dick, Alice, Karl Best (possible), Brian G., Ken Nidiffer
Dick, Alice, Karl Best (possible), Brian G., Ken Nidiffer
Cihan (support)
Dave, Ricardo, Sandy, Barry
Brian Wells, Ricardo P.
Topic: Quality Engineering
Topic: Electromagnetic Interference/Electromagnetic Compatibility
Topic: Resilience Engineering
Topic: Manufacturability and Producibility
Topic: Affordability

Barry, Brian Wells, Ray, Garry

Topic: Environmental (title to be finalized)

TBD

Topic: Workplace Engineering

Part 7: Systems Engineering Implementation Examples

Matrix of Implementation Examples
Case Studies
Hubble Space Telescope Case Study
Global Positioning System Case Study
Medical Radiation Case Study
FBI Virtual Case File System Case Study
MSTI Case Study
Next Generation Medical Infusion Pump Case Study

Vignettes
Denver Airport Baggage Handling System Vignette
Virginia Class Submarine Vignette
UK West Coast Route Modernization Project Vignette
Singapore Water Management Vignette
FAA Advanced Automation System (AAS) Vignette
Standard Korean Light Transit System Vignette
Appendix D: Staffing Matrix

Please note: The staffing matrix reflects the outcome at the end of Workshop VII (June 14, 2011).

| Role         | Part   | Article(s)                                                                 | SEBoK 0.75 | GRCSE | Integration Team
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Appendix E: Action Items & Milestones

The following are major milestones for the BKCASE author team through Workshop VIII

- **SEBoK 0.75**: Part Teams will begin drafting articles immediately after Workshop VIII
  - Initial work will be offline. A developmental version of the 0.75 wiki will be available as soon as possible. (This will be separate from the public version of 0.5 open for review.)
  - Authors should be examining the comments for SEBoK 0.5 ([www.sebokwiki.org](http://www.sebokwiki.org)) as they refine materials for SEBoK 0.75.

Below is a list of specific action items, as outlined in this report.

1. **All authors should ensure that they have at least one assignment for SEBoK 0.75 or GRCSE 0.5.**
2. Develop an updated version of the SEBoK concept map, which will be used for integration. *Sandy Friedenthal and Steve Mitchell* to develop; the *Part Team Leads* to review and correct any noted inconsistencies/gaps.
3. Determine whether and how to incorporate some aspect of the concept map into the next iteration of the SEBoK. *Sandy Friedenthal* to lead.
4. Develop a PDF version of the SEBoK that can be posted to the wiki and downloaded. *Core Team*
5. Provide staffing updates as all authors identify their assignments. *Part Team Leads*
6. Group should think of the general Wiki related comments or problems you come across as you review the Wiki and provide the core team with discoveries post review or at the next workshop. *All Authors*