

BKCASE™

*Body of Knowledge and Curriculum
to Advance Systems Engineering*

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www.bkcase.org

BKCASE - Resolution Passed at ISO/IEC JTC1/SC7 Meeting in Niigata

- Resolution 1288 – passed 28 May 2010
- SC 7 accepts the invitation of the BKCASE project to participate in the reviewing, commenting, and consensus formation processes of the forthcoming development of the Systems Engineering Body of Knowledge (SEBoK) and encourages its experts to participate directly with the BKCASE project team. SC 7 also invites the BKCASE project to do whatever is necessary to submit the SEBoK for fast-track approval under the provisions of sub-clause 16.5 of the ISO/IEC JTC 1 Directives.

Opportunities and Implications



Opportunities

- Provides additional expert reviewers who can help ensure alignment with key standards
- Same route taken by SWEBoK – provides a single point of access for both SEBoK and SWEBoK
- Fast-track will provide higher visibility and credibility

Implications

- Need to ensure same type of agreement for IP ownership as IEEE has for SWEBoK – should be no problem

SEBoK 0.25 Review Process

Nicole Hutchison & Steph Enck

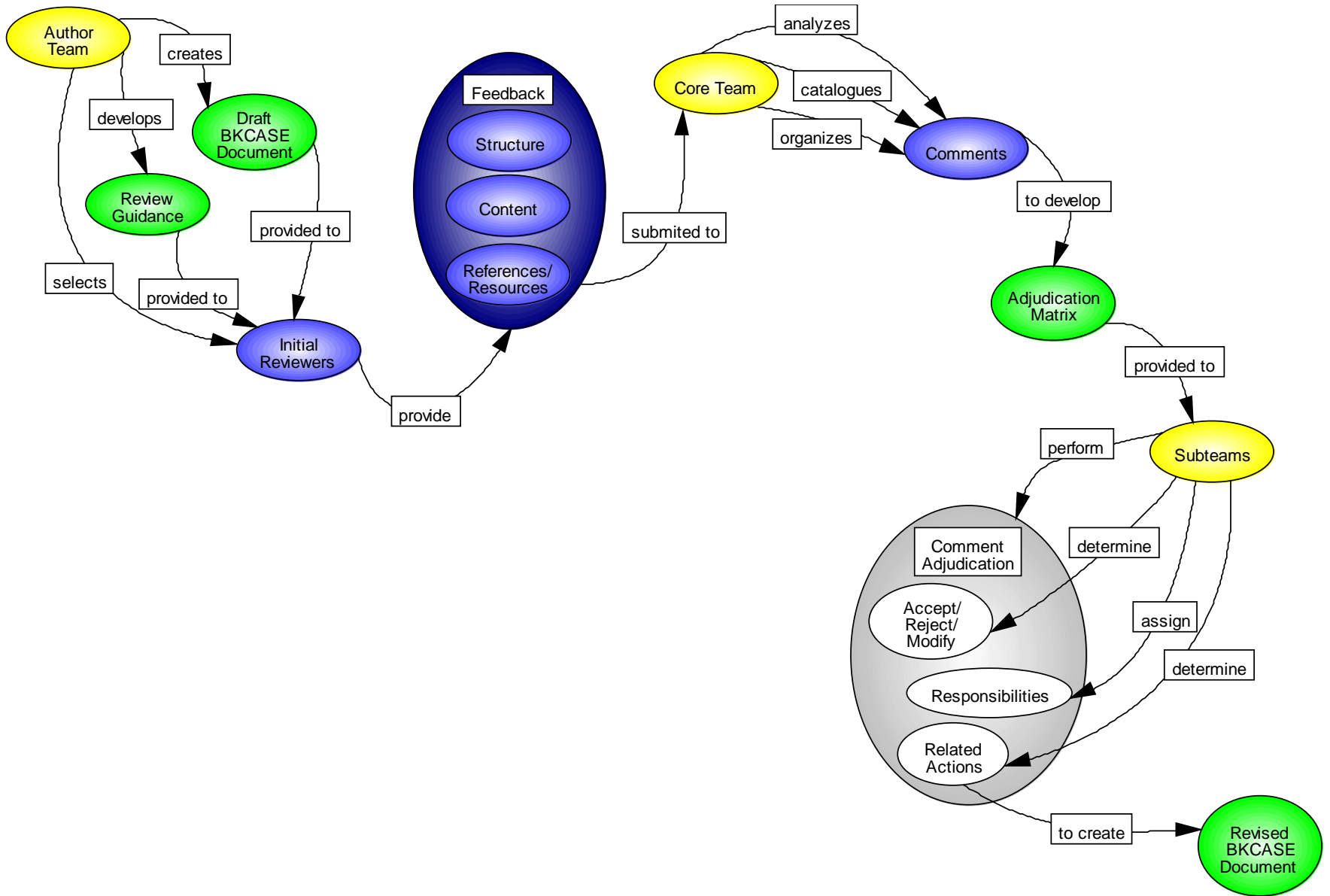
BKCASE Workshop III

Purpose

The purpose of releasing SEBoK 0.25 for review is to:

- gain community visibility and acceptance for the BKCASE project;
- receive community feedback on the scope, structure, and content of SEBoK;
- gain additional perspectives on the SEBoK (e.g. feedback from individuals in additional application domains, business models, etc.);
- provide feedback to the community regarding the influence of reviews (open, collaborative process); and
- Opportunity for authors to comment on whole document
- Improve the SEBoK

Systemigram



Overall Process

- **Solicitation.** Draft version 0.25 will be emailed to selected reviewers and the author team, along with guidance on the types of review comments we would like to see.
- **Review Period.** The document will be released for a 1-month review period.
- **Submission.** Reviews will be submitted by emailing comments to both Stephanie and Nicole. This is expected to be fairly informal for version 0.25.
- **Comment Catalogues.** Each reviewer's information will be recorded along with his/her comments on the document by either Stephanie or Nicole. As the comments are collected, they will be categorized as appropriate.

Overall Process (cont.)

- **Review.** The combined results of reviews will be distributed to the author team *prior* to the next scheduled workshop to allow teams time to review comments.
- **Adjudication.** Once all comments have been adjudicated, the final decisions/actions will be recorded in a master matrix.
- **Publication.** The adjudication matrix will be PDF'd as an archive of the review process and posted on the BKCASE website.

Items Sent to Reviewers

- SEBoK 0.25 document
- Guidance (email)
- PDF form (helps target review)

Information Collected

- Reviewer Information
 - ID (Name, Affiliation, Email)
 - Application Domain
- Review Comments
 - Overarching (scope, organization, etc.)
 - Section-specific (tbd)
 - Additional references/resources
 - Additional topic areas

Data Submission

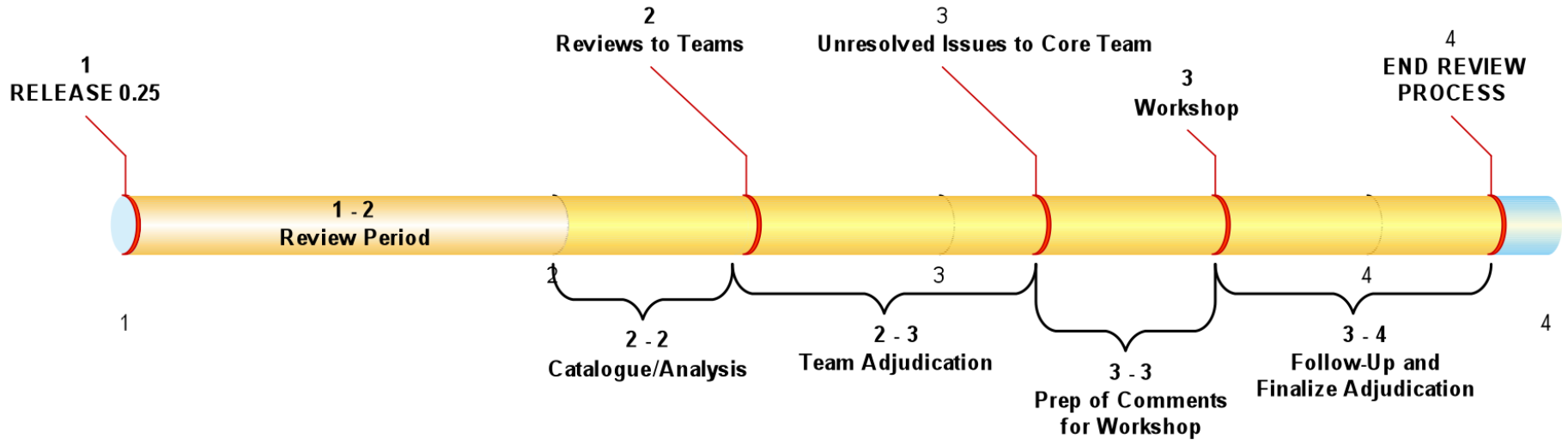
Reviewer data can be submitted by:

- PDF form (preferred)
- Email
- track changes (discouraged)

Review Adjudication

- Each comment will be adjudicated using the following scale:
 - Accept (comment will be accepted and incorporated into the document as is)
 - Modify (part of the comment will be accepted and implemented)
 - Reject (the comment will be rejected)
- For “modify” and “reject”, the rationale for the decision will be recorded
- For all comments, any actions taken and the individual(s) responsible will be recorded

Timeline



Time from release to completion of adjudication is estimated @ 3.5 months







BKCASE Workshop III

Summary of Day One

Hyatt Regency Hotel
Rosemont, Illinois
July 7-8, 2010

Workshop Objectives

1. Finalize release criteria for SEBoK 0.25 
2. Review draft SEBoK 0.25 materials and agree on plan to produce 0.25 by September 15, 2010 
3. Standardize and de-conflict terminology for SEBoK 0.25 
4. Finalize SEBoK 0.25 review plan and materials 
5. Review initial GRCSE materials and agree on plan to produce draft 0.25 by December 15, 2010
6. Review proposed Wiki structure, uses, technology, and protocols

Wednesday's Agenda

Time	Topic
7:30a	<i>Continental breakfast in the meeting room</i>
8:00a	Agenda overview, opening remarks, new author and guest introductions – <i>Art Pyster</i>
9:00a	Finalize release criteria for SEBoK 0.25 – <i>Dave Olwell</i>
10:00a	Discussion of SEBoK 0.25 materials and issues – <i>Art Pyster</i>
10:30a	<i>Break</i>
10:45a	Discussion of SEBoK 0.25 (continues) – <i>Art Pyster</i>
12:00p	Lunch (<i>Garry Roedler, ISO/IEC Update for 15 minutes</i>)
1:00p	Discussion of SEBoK 0.25 (continues) – <i>Art Pyster</i>
3:00p	<i>Break</i>
3:15p	Discussion of SEBoK 0.25 and release plan – <i>Art Pyster</i>
5:00p	SEBoK 0.25 Review Plan – <i>Steph Enck and Nicole Hutchison</i>
6:00p	Adjourn
6:30p	<i>Group dinner at Carlucci's in Rosemont – Shuttle Service Provided</i>

State of SEBoK 0.25

1. On track for September 15 release – tremendous job by authors
2. Submitted material uneven in completeness, depth, writing style, references, etc. -- very much expected
3. Core Team took great liberties in producing document sent to authors on July 2 – attempted to create single document from many
4. Now have ~~13~~ 16 chapters – broke Technical Knowledge into ~~3~~ 4 chapters – ~~Early, Mid, and Late~~
5. Shrunk draft and moved material between chapters – there was lots of redundancy

6. Sometimes too prescriptive – need to be more descriptive
7. Too oriented towards government contracting and government acquisition/supplier model
8. Changed Special Design Considerations to Cross-Cutting Knowledge
9. Added parenthetical advice to authors
10. Highlighted some places where references are needed

State of SEBoK 0.25

11. Too much copying from other sources – even if properly cited and with permission
12. Writing is generally too focused on product SE without adequate coverage of service SE and enterprise SE
13. Glossary terms often not filled in and many terms not defined even in the text

Issues still open

- Permissions to reproduce/ adapt / derive figures and tables
 - Consolidate permission list at core team and send out one letter to each source
 - “Fair use” still ill-defined; legal advice pending

Assessment of Work Remaining in Individual Chapters

1. Introduction: Low
2. Systems Concepts and Systems Thinking: Low
3. Systems Engineering Overview: Low
4. SE Life Cycle Knowledge: High
5. SE Organization Knowledge: High
6. SE Management Knowledge: Medium

Assessment of Work Remaining in Individual Chapters

7. Early Life Cycle SE Technical Knowledge: High
8. Mid Life Cycle SE Technical Knowledge: Medium
9. Late Life Cycle SE Technical Knowledge: High
10. SE Agreement Knowledge: Low
11. SE Cross Cutting Knowledge: High

Assessment of Work Remaining in Individual Chapters

12. SE Competencies Knowledge: Low

13. Application Domains and Case Studies: Low

Summary of Chapter Status

- 6 chapters require Low additional work
- 2 chapters require Medium additional work
- 5 chapters require High additional work

- (Old numbering scheme).

- SC7 to help review BKCASE, and invites us to apply for fast track approval as an ISO technical report.
- Still freely distributed.
- Garry Roedler and Paul Croll are on the TAG.

- Keith and Karl glad to be here
- Liaison established
- Several areas where PMI can help identified

V 0.25 Release Criteria (Amended)

1. All authors have signed and returned the author release form;
2. The BKCASE project has the right to use or the right to use is in process for all figures not developed by the author team;
3. The following sections are reasonably mature: Introduction (Chapter 1), Systems Concepts and Thinking (Chapter 2), and Systems Engineering Overview (Chapter 3)
4. All other Chapters are reasonably mature, meaning each Chapter has an appropriate organizational structure with fairly complete topic and sub-topic lists, “obvious” material is included, scope is appropriate, glossary terms are identified, primary references are identified, and there is a statement of maturity (stable, evolving, immature);

Release Criteria Continued

5. No more than 2 Chapters are blank;
6. The Core Team has approved the document with regards to technical editing and readability;
7. Critical overlaps in material are corrected while non-critical overlaps which are not yet corrected are identified;
8. Critical inconsistencies are corrected while major inconsistencies which are not yet corrected are identified;
9. Critical gaps are noted and characterized; and
10. The author team is reasonably comfortable with the draft presented at Workshop III.

Added four chapters (9-12)

- **System Definition**

- Introduction

- Fundamentals

- Mission Analysis and Stakeholder Requirements

- System Requirements

- Architectural Design

- System Analysis

- **Realization**

- Implementation

- System Integration

- System Verification

- System Validation

- **Deployment and Use**

- Transfer for use or deployment

- Operation of the system

- **Life Management**

- Maintenance and Logistical Support

- Service Life extension

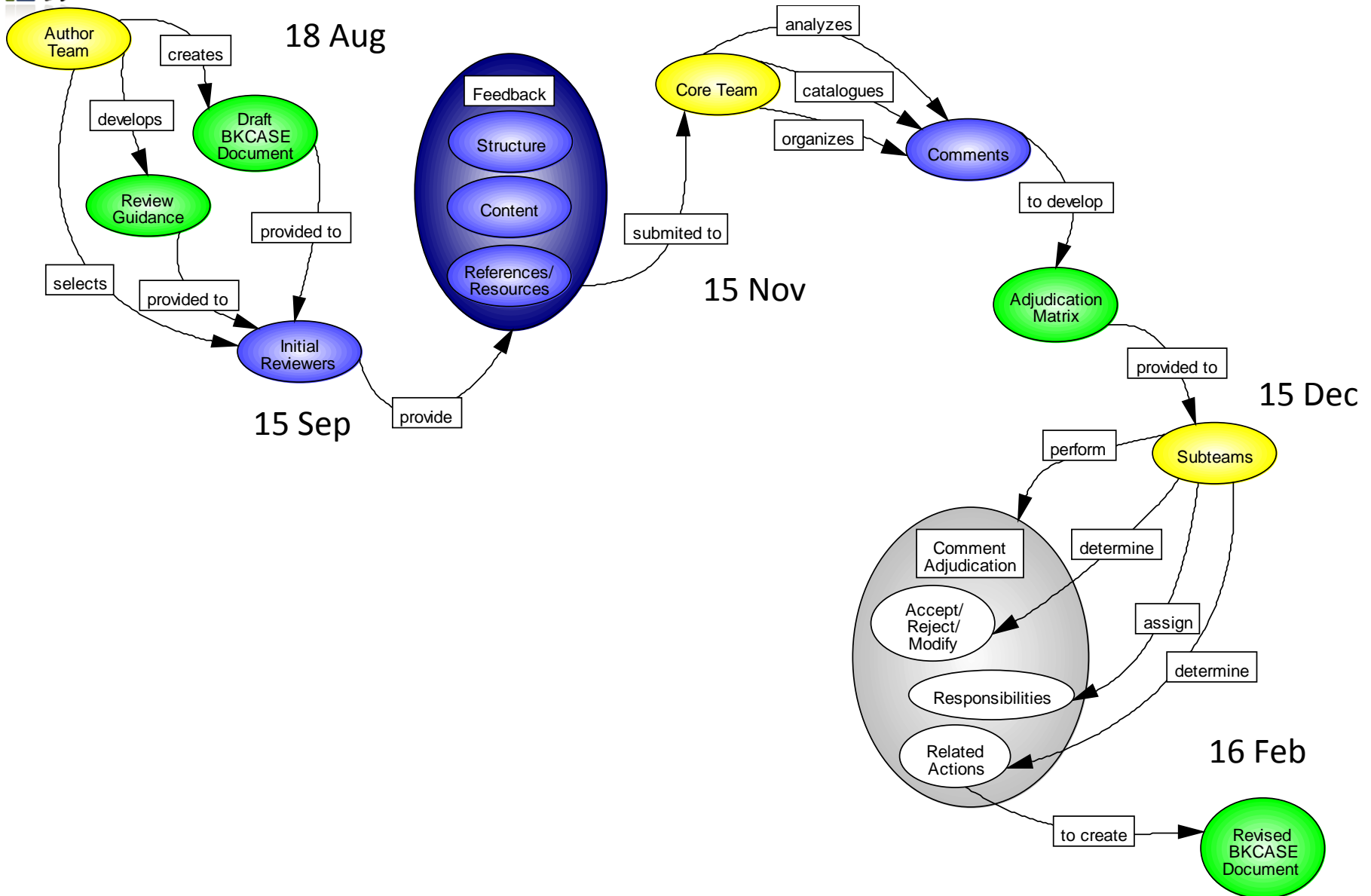
- Update/upgrade

- Disposal or retirement



Chapters reorganized and team members assigned

Review Process Systemigram



Timeline established

- 30 July: dump of current content to core team, all permission needs identified, and nominations of five reviewers with contact and brief background information
- 18 Aug: “no kidding” cut-off for submission of SEBoK v0.25 materials to core team.
- 15 Sept: Core team publishes V0.25 to reviewers.
- NLT 15 Nov: Reviewers return comments
- NLT 15 Dec: Comments to lead authors for response
- 26-27 Jan: Workshop discussion of adjudication to date; any major issues flagged and response strategy determined
- 16 Feb: All comments adjudicated and returned to Core team.
- NLT April workshop: Adjudication matrix released for v.025. Strategy for V0.50 finalized.

Excellent dinner and social time!



Another meeting, another chow line



Accepting the prize.....



Wow – more chow!









BKCASE Workshop IV hosting in Toulouse (France) 13th -14th Oct 2010

BKCASE Workshop III – Chicago- 7/8 July 2010

Jean-Claude Roussel / Alain Faisandier

France (Toulouse on 13/14 Oct 2010)



BKCASE Workshop IV at Toulouse is co-sponsored by EADS, MAP SYSTEM and the French INCOSE Chapter (AFIS)

It covers the following :

- Workshop hosting in Mercure Atria Hotel in Toulouse downtown (Centre de congrès P.Baudis, location of IS04) for the 13th and 14th Oct including meeting rooms /facilities, coffee breaks and lunches.
- A diner on 13th Oct evening
- An optional visit of Airbus site (A380 Assembly line) in Toulouse on Friday 15th Oct morning. Transportation from Toulouse downtown (Main hotels) will be organised.

A suggestion of a list of hotels closely located has just been sent to Stephanie in order to start with the hotel booking in a short term

Logistics and coordination ensured by ASK International Conference



National Defense Industrial Association (NDIA) SE Conference

- The annual NDIA Systems Engineering Conference explores the role of systems engineering in defense programs from all aspects and perspectives, including the pragmatic, practical and academic viewpoints, and brings key practitioners together to work on effective solutions to achieving a successful warfighting force.
- Hyatt Regency Mission Bay, San Diego, CA, October 25-28, 2010.
- <http://www.ndia.org/meetings/1870/Pages/default.aspx>

NDIA SE Conference Sponsors

- NDIA Systems Engineering Division
- Office of Under Secretary of Defense for Acquisition, Technology and Logistics – Director, Systems Engineering
- Office of the DoD Chief Information Officer
- Technical co-sponsorship by:
 - IEEE Aerospace and Electronic Systems Society
 - IEEE Systems Council
 - International Council on Systems Engineering

Proposed Schedule

- Oct 25 Monday – Tutorials
- Oct 26 Tuesday – Plenary Sessions all day
- Oct 27 Wednesday – Papers and Panels
- Oct 28 Thursday – Papers and Panels

They Are Oversubscribed!

- NDIA received record 392 abstracts and tutorials
- Can only accept ~230-240 depending on the final meeting space at the hotel – in work
- A complete track can only have 21 paper slots (12 on Wednesday and 9 on Thursday)
- One additional breakout room = 21 more paper slots
- Removing one plenary session on Tuesday would provide 30 more paper slots

- We're negotiating for four 90-minute sessions for BKCASE (equivalent to 12 papers) on Wednesday
- Need to de-conflict with Workforce Development Track (9 papers on Thursday)
- Best approach: plan for four BKCASE sessions until informed otherwise

Proposed Tracks (1)

1. Advancing the Practice (SE Research)
2. Affordable Readiness & Reduction of Total Ownership Cost
3. Architecture
4. Early Systems Engineering
5. Human Systems Integration
6. Enterprise Health Management
7. Integrated Diagnostics/Prognostics
8. Keeping Legacy Systems Viable
9. Logistics Systems
10. Modeling & Simulation
11. Practical SE Experience
12. Program Management
13. Reliability, Availability, Maintainability

Proposed Tracks (2)

14. Requirements Development
15. Software-Intensive Systems
16. Specialty Engineering
17. System Assurance
18. System Safety-ESOH
19. Systems Engineering Development Environment
20. Systems Engineering Effectiveness
21. Systems of Systems
22. Technology Maturity
23. Test & Evaluation in Systems Engineering
24. T&E/SOS
- 25. Workforce Development & BKCASE**
26. Net-Centric Operations/Interoperability

References, RefWorks, and Copyright for SEBoK 0.25

Hyatt Regency, Rosemont, IL

BKCASE Workshop III

Nicole Hutchison

References

- Comments on materials submitted June 20, 2010:
 - Many references were incomplete (over 40 hours required to look up and correct all references)
 - Still some conflict between reference sources
 - Many strong statements without any associated references
 - Overall, many more references required to strengthen the SEBoK

SEBoK—Reference Types

- There are essentially 3 types of references for SEBOK:
 - **Primary:** references which are considered essential/canon for a particular subject. The expectation is that all of these references will appear in the chapter summary
 - **Additional References:** Additional materials *cited within the document* which provide additional information but are not considered primary
 - **Additional Readings:** Additional materials that are *not cited in the document* but which may provide useful information or perspectives for a SEBoK user
- For SEBoK 0.25, additional references and additional readings are placed in the same category.

Reference Requirements

- All references must include the required information as dictated by the *Chicago Style Manual, 15th Ed.*
 - Examples appear in the style guide
 - A two-page quick guide on references was sent to the author team; this will be revised and re-sent. Please use this to complete 0.25
- Any quotation *must* be accompanied by the appropriate citation (Author, Date, page)
- *Page numbers should be included in text, not in the reference itself (enables reuse)*

A few cautions . . .

- Citing a specific single organization or group is discouraged
 - e.g. some submitted materials say things like “An organization that does X well is Y”
 - Multiple examples should be provided if discussing specific examples
 - No value judgments should be made about the examples (unless they are well-documented and *not* author opinion)

RefWorks™

- For 0.25, RefWorks™ is used to track all references and insert both references and bibliographies
 - Web-based tool which stores all references in a database
 - References can be sorted into any number of folders (currently by chapter)
 - Citations and reference lists are inserted using WriteNCite™ which ensures standardization

RefWorks™ Use

- For 0.25, references will be provided by each chapter's author team within the document
- Nicole & Steph will enter all references in RefWorks™ and insert the formatted citations using WriteNCite™ in the final document.
- It is possible that authors may be given access to RefWorks™ after 0.25, but an appropriate governance model for this has not yet been decided

Copyright Permission

- All figures pulled from other sources (either directly or derived) *must* be accompanied by copyright permission.
 - For 0.25, it is OK if copyright has not been attained as long as the copyright permission process has been initiated
- Stevens' legal is currently reviewing a template for copyright release.
 - Once completed, this will be distributed to the author team along with instructions for use
 - For commonly-used resources, the core team will provide guidance on how to aggregate requests

Systems Engineering Body of Knowledge (SEBoK) Wiki Approach

SEBoK Workshop in Chicago
July 7-8, 2010

Sanford Friedenthal
sanford.friedenthal@lmco.com

Agenda

- Background/Motivation
- Initial Findings/Exploration
- SEBoK Wiki Use Cases
- Proposed SEBoK Wiki Transition Plan

Background

- Splinter Content Management WG established at INCOSE IW in Feb '2010
 - Explore approach to SEBoK content capture and management using Wiki and Modeling technologies
 - Make recommendations to SEBoK Team
- Participants
 - Sanford Friedenthal (Lockheed Martin)
 - Hans-Peter de Koning (European Space Agency)
 - Steve Jenkins (Jet Propulsion Lab)
 - David Lempia (Rockwell Collins)
 - Paola Di Maio (new member)
 - Art Pyster (Stevens Institute of Technology)

Wiki Motivation

- Systems Engineering Body of Knowledge is an aggregation of knowledge across a broad field with many authors, and will continue to evolve over time
- Need mechanism to effectively capture and manage knowledge content over time
 - Consistent
 - Unambiguous
 - Completeness relative to scope
 - Shareable and controlled environment
- Need effective navigation and search mechanisms for inter-related content
- Soft copy documents are inadequate
- Wiki and modeling technologies offer potential solution

Initial Results from Exploration

- Current Systems Engineering Wiki's exists
 - Wikipedia
 - SE Handbook on INCOSE Connect
- Semantic Wiki Technology similar to what is used in Wikipedia can be used to manage SEBoK content
- Use of modeling technology will be deferred for now
 - Labor intensive to capture unstructured content in model although potential exists for future
- Recommend transitioning to Wiki environment

Systems Engineering Wiki

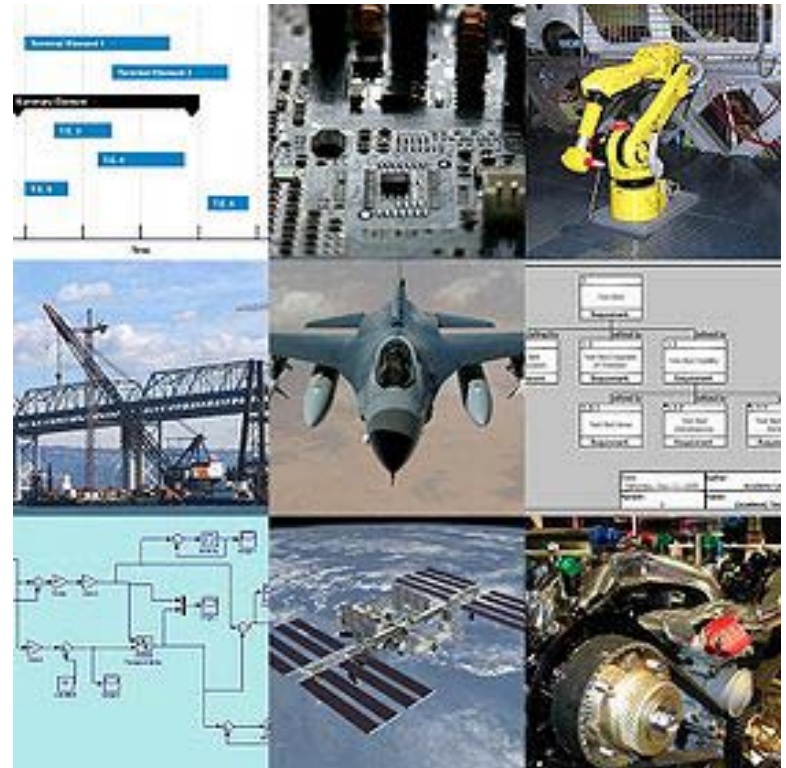
http://en.wikipedia.org/wiki/Systems_engineering

Systems engineering is an [interdisciplinary](#) field of [engineering](#) that focuses on how complex engineering projects should be designed and managed. Issues such as [logistics](#), the coordination of different teams, and automatic control of machinery become more difficult when dealing with large, complex projects. Systems engineering deals with work-processes and tools to handle such projects, and it overlaps with both technical and human-centered disciplines such as [control engineering](#) and [project management](#).

Contents

[hide]

- [1 History](#)
- [2 Concept](#)
 - [2.1 Origins and traditional scope](#)
 - [2.2 Holistic view](#)
 - [2.3 Interdisciplinary field](#)
 - [2.4 Managing complexity](#)
 - [2.5 Scope](#)
- [3 Education](#)
- [4 Systems engineering topics](#)
 - [4.1 System](#)
 - [4.2 The systems engineering process](#)
 - [4.3 Using models](#)
 - [4.4 Tools for graphic representations](#)
- [5 Closely related fields](#)
- [6 See also](#)
- [7 References](#)
- [8 Further reading](#)
- [9 External links](#)



Results from Exploration

Wiki-Based Prototype Technology

- Uses MediaWiki, the open source software that runs Wikipedia
 - See <http://www.mediawiki.org>
- And Semantic MediaWiki (SMW)
 - helps to search, organize, tag, browse, evaluate, and share the wiki's content
 - "While traditional wikis contain only text which computers can neither understand nor evaluate, SMW adds semantic annotations that let you easily publish Semantic Web content, and allow the wiki to function as a collaborative database."
 - free open source extension of MediaWiki
 - See <http://www.semantic-mediawiki.org>

Wiki-Based Prototype Platform

- Hosted on <http://www.referata.com/>
 - Small New York based service company, active participant in SMW open source development
- Created experimentation account
 - http://sesandbox.referata.com/wiki/BKCASE_SE_BoK_Prototype_Wiki
 - Managed by Hans Peter de Koning (ESA)
 - Access only through specifically created user accounts
 - Small monthly fee

Wiki-Based Prototype Status

- Some experimental content
 - Using material from INCOSE SE Handbook v3.2
 - Standard wiki content:
outline and a few sections
 - Semantic wiki content:
Glossary of Terms
References
with creation forms and overview pages
- Very easy and quick to set-up and manage
- Appealing / easy interfaces for users and developers

BKCASE Wiki - Main Page

The screenshot shows a Mozilla Firefox browser window displaying the BKCASE SE BoK Prototype Wiki main page. The browser's address bar shows the URL: http://sesandbox.referata.com/wiki/BKCASE_SE_BoK_Prototype_Wiki. The page title is "BKCASE SE BoK Prototype Wiki - Syst...".

The page content includes a navigation sidebar on the left with sections: navigation (Main Page, BKCASE Prototype, Recent changes, Browse data), add data (Add... (change this), Add new term), help (Help, Referata help), data export (View XML, RDF), search (Go, Search), and toolbox (What links here, Related changes, Upload file, Special pages, Printable version, Permanent link, Upload multiple files, Browse properties).

The main content area features a "page" tab and a toolbar with actions: discussion, edit, history, delete, move, protect, watch, and refresh. The page title is "BKCASE SE BoK Prototype Wiki".

The main text reads: "This is the **prototype implementation** of a [Semantic Wiki](#) for the [BKCASE \(Body of Knowledge and Curriculum to Advance Systems Engineering\)](#) Systems Engineering Body of Knowledge (SE BoK). For prototyping purposes we use content from the established INCOSE Systems Engineering Handbook v3.2 as published in the [INCOSE Connect Product Area](#) (accessible to INCOSE members only)."

A "Contents [hide]" section lists the following items:

- 1 INCOSE Systems Engineering Handbook v3.2
 - 1.1 Chapter 1 Systems Engineering Handbook Scope
 - 1.1.1 1.1 Purpose
 - 1.1.2 1.2 Application
 - 1.1.3 1.3 Contents
 - 1.1.4 1.4 Format
 - 1.1.5 1.5 Definitions of Frequently Used Terms
 - 1.1.6 1.6 References
 - 1.2 Chapter 2 Systems Engineering Overview
 - 1.3 Chapter 3 Generic Life-Cycle Stages
 - 1.4 Chapter 4 Technical Processes
 - 1.5 Chapter 5 Project Processes
 - 1.6 Chapter 6 Agreement Processes
 - 1.7 Chapter 7 Organizational Project-Enabling Processes
 - 1.8 Chapter 8 Tailoring Processes
 - 1.9 Chapter 9 Specialty Engineering Activities
 - 1.10 Appendix A: System Life-Cycle Process N2 Chart
 - 1.11 Appendix B: System Life-Cycle Process Mappings
 - 1.12 Appendix C: Acronym List
 - 1.13 Appendix D: Terms and definitions
 - 1.14 Appendix E: Acknowledgements
 - 1.15 Appendix F: Comment Form
 - 1.16 Index
- 2 Currently Applied Semantic Media Wiki (SMW) Technology

Below the contents list, the page shows the following sections with edit links:

- [INCOSE Systems Engineering Handbook v3.2](#) [edit]
- [Chapter 1 Systems Engineering Handbook Scope](#) [edit]
- [1.1 Purpose](#) [edit]

The status bar at the bottom left of the browser window shows "Done".

BKCASE Wiki - Glossary of Terms Overview

The screenshot shows a Mozilla Firefox browser window displaying the BKCASE Wiki page for the 'Category:GlossaryOfTerms' in the 'Systems Engineering Sandbox'. The browser's address bar shows the URL: <http://sesandbox.referata.com/wiki/Category:GlossaryOfTerms>. The page features a navigation menu with options like 'category', 'discussion', 'edit', 'history', 'delete', 'protect', 'watch', and 'refresh'. A sidebar on the left contains sections for 'navigation', 'add data', 'help', 'data export', 'search', and 'toolbox'. The main content area is titled 'Category:GlossaryOfTerms' and includes a 'Create a new term' button. Below this, it lists 'Pages in category "GlossaryOfTerms"' with 17 pages in total. The pages are organized into columns: '-ilities', 'A' (Acquirer, Acquisition logistics, Activity, Agile), 'A cont.' (Agreement, Assembly), 'B' (Baseline), 'C' (Capability, Commercial off-the-shelf, Component), 'C cont.' (Configuration item (CI)), 'H' (Human factors), and 'S' (Stakeholder, Subassembly, Subsystem, System). At the bottom, there is a 'Facts about GlossaryOfTerms' section with an 'RDF feed' icon and a note that the default form is 'DefinitionOfTerm'.

Category:GlossaryOfTerms - Systems Engineering Sandbox - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://sesandbox.referata.com/wiki/Category:GlossaryOfTerms

Category:GlossaryOfTerms - System...

HansPeter my talk site settings admin links my preferences my watchlist my contributions log out

category discussion edit history delete protect watch refresh

Category:GlossaryOfTerms

This category has default form [DefinitionOfTerm](#).

Pages in category "GlossaryOfTerms"

The following 17 pages are in this category, out of 17 total.

-	A cont.	C cont.
<ul style="list-style-type: none">-ilities	<ul style="list-style-type: none">AgreementAssembly	<ul style="list-style-type: none">Configuration item (CI)
A	B	H
<ul style="list-style-type: none">AcquirerAcquisition logisticsActivityAgile	<ul style="list-style-type: none">Baseline	<ul style="list-style-type: none">Human factors
	C	S
	<ul style="list-style-type: none">CapabilityCommercial off-the-shelfComponent	<ul style="list-style-type: none">StakeholderSubassemblySubsystemSystem

Facts about GlossaryOfTerms RDF feed

Has default form [DefinitionOfTerm](#)

Hosted by Referata

This page was last modified on 21 March 2010, at 21:54. This page has been accessed 41 times. Content is available under INCOSE © 2010 - All rights reserved. Privacy policy About Systems Engineering Sandbox Disclaimers

Powered By

Done

BKCASE Wiki – Term "System" Page

The screenshot shows a Mozilla Firefox browser window displaying the BKCASE Wiki page for the term "System". The browser's address bar shows the URL <http://sesandbox.referata.com/wiki/System>. The page title is "System - Systems Engineering Sand...". The main content area features a navigation menu on the left with options like "Main Page", "BKCASE Prototype", "Recent changes", and "Browse data". The main content area includes a "System" header, a "Definition" section with the text "combination of interacting elements organized to achieve one or more stated purposes", a "Definition faithfulness" section with the text "Verbatim", a "Reference" section with the text "ISO/IEC 15288:2008", and a "Note(s)" section with the text "In other words, a system is an integrated set of elements, subsystems, or assemblies that accomplish a defined objective. These elements include products (hardware, software, firmware), processes, people, information, techniques, facilities, services, and other support elements. (INCOSE)". There is also an "Example(s)" section and a "Category: GlossaryOfTerms" section. A "Facts about System" section is visible at the bottom of the main content area, showing a table with columns for "Definition", "Definition faithfulness", "Note", and "Reference". The page footer includes a "Hosted by Referata" logo, a timestamp "This page was last modified on 28 June 2010, at 09:49.", a page view count "This page has been accessed 6 times.", and a copyright notice "Content is available under INCOSE © 2010 -". There are also logos for "Powered by MediaWiki" and "Powered by Semantic MediaWiki".

System

Definition combination of interacting elements organized to achieve one or more stated purposes

Definition faithfulness Verbatim

Reference [ISO/IEC 15288:2008](#)

Note(s) In other words, a system is an integrated set of elements, subsystems, or assemblies that accomplish a defined objective. These elements include products (hardware, software, firmware), processes, people, information, techniques, facilities, services, and other support elements. (INCOSE)

Example(s)

Category: [GlossaryOfTerms](#)

Facts about System

Definition	combination of interacting elements organized to achieve one or more stated purposes
Definition faithfulness	Verbatim +
Note	In other words, a system is an integrated set of elements, subsystems, or assemblies that accomplish a defined objective. These elements include products (hardware, software, firmware), processes, people, information, techniques, facilities, services, and and other support elements. (INCOSE)
Reference	ISO/IEC 15288:2008 +

BKCASE Wiki – Term "System" Edit Form

The screenshot shows the 'Edit DefinitionOfTerm: System' page in the BKCASE Wiki. The browser window title is 'Edit DefinitionOfTerm: System - Systems Engineering Sandbox - Mozilla Firefox'. The address bar shows the URL: <http://sesandbox.referata.com/w/index.php?title=System&action=formedit>. The page features a navigation menu with options like 'page', 'discussion', 'edit with form', 'edit', 'history', 'delete', 'move', 'protect', 'watch', and 'refresh'. The main content area is titled 'Edit DefinitionOfTerm: System' and contains several form fields:

- Definition:** A text area containing the text: "combination of interacting elements organized to achieve one or more stated purposes".
- Definition faithfulness:** A dropdown menu set to 'Verbatim'.
- Reference:** A dropdown menu set to 'ISO/IEC 15288:2008'.
- Note:** A text area containing the text: "In other words, a system is an integrated set of elements, subsystems, or assemblies that accomplish a defined objective. These elements include products (hardware, software, firmware), processes, people, information, techniques, facilities, services, and other support elements. (INCOSE)".
- Example:** A text area containing the text: "An example would be an air transportation system."
- Free text:** An empty text area.
- Summary:** An empty text area.

At the bottom of the form, there are checkboxes for 'This is a minor edit' and 'Watch this page', and buttons for 'Save page', 'Show preview', 'Show changes', and 'Cancel'. The footer of the page includes the Referata logo, a timestamp 'This page was last modified on 28 June 2010, at 09:49.', access statistics, and a Creative Commons license notice. It also features logos for 'Powered By MediaWiki' and 'Powered By Semantic MediaWiki'.

SEBoK Use Cases

- The Wiki captures and shares the SEBoK in a collaborative environment

SEBoK Use Cases (cont.)

- Update Content
 - **Purpose:** A content contributor authenticates themselves and then updates an article in SEBOK
 - **Trigger:** Content Contributor finds a mistake, wants to make an improvement to an existing article, or wants to create a new article.
- Review and Approve Content
 - **Purpose:** A reader authenticates themselves and makes a suggestion or asks a question to other readers and the content contributor about a particular article.
 - **Trigger:** A reader wants to discuss an article with other readers or with the content contributor.
- Query Content
 - **Purpose:** A reader finds and reads an article in the SEBOK.
 - **Trigger:**
 - 1) Search in external search engine such as Google
 - 2) Search in internal tool (SEBOK)
 - 3) Browse down from home page of SEBOK
 - 4) Click on link in e-mail
 - 5) Click on short code in text message or twitter
- Administer SEBoK

SEBoK Wiki Transition Plan

- Conduct initial exploration of Wiki and Modeling Technologies - done
- Present preliminary findings at SEBoK Workshop on July 7-8 in Chicago
- Demonstrate preliminary approach using SEBoK v.25
 - Capture selected portions of SEBoK v0.25 in Wiki
 - Assess content issues (i.e. inconsistencies, ambiguities, ..)
 - Establish author guidelines for converting and authoring new content to Wiki
 - Demonstrate Wiki approach to support use cases at SEBoK Workshop on Oct 13-14 in Toulouse
- Agree on Wiki transition plan for SEBoK v0.5



BKCASE: Authoring Principles and Guidelines

A 'Quick' Open Discussion

Agenda

- Objective
- Context
- Principles
- Guidelines



Objective



The objective of this open discussion is to come to a group consensus on the principles and guidelines for authoring activities related to the BKCASE team effort. The intent is to provide a consistent understanding amongst BKCASE team members in the form of a set of established principles and guidelines for authoring activities going forward.

Context



- Paper, Presentation, etc...
- Journal, Magazine, Newsletter, etc..
- Conference Sessions, Working Meeting, etc...
- Peer-Reviewed (or not), Invited, Editorial, etc...
- Public or Private

Intention is that any and all presentations and published works, whether provided to a limited audience or publicly provided, fall under the purview of the BKCASE principles and guidelines established.

Principles



- Alignment
 - BKCASE Vision and Objectives
 - Intent of BKCASE core and author team
- Authority / Credibility
 - Global SE Community
 - Industry, Government, Academia
 - Related Disciplines
- Fairness / Code of Conduct
 - Proper acknowledgement of source
 - Courtesy and fairness to fellow authors
 - Etiquette and Ethical considerations
 - Legal/Copyright/IP considerations
 - What Else?

Guidelines



- **Required:** Obtain Permission/Approval from co-PIs (Art, Dave)
- Notify Core BKCASE Team
 - Allow for review cycle
- Notify Corresponding Author Team
 - Undergo review cycle
- Use proper reference and citing of BKCASE team publications
- Leverage generic slide deck – available on Sakai
- What else?

Reference/Backup Slides

Vision and Objectives



Vision

“Systems Engineering competency models, certification programs, textbooks, graduate programs, and related workforce development initiatives around the world align with BKCASE.”

Objectives

1. Create a SEBoK that is globally recognized by the SE community as the authoritative BoK for the SE discipline.
2. Create a graduate reference curriculum for SE (GRCSE – pronounced “Gracie”) that is globally recognized by the SE community as the authoritative guidance for graduate programs in SE.
3. Facilitate the global alignment of related workforce development initiatives with SEBoK and GRCSE.
4. Transfer stewardship of SE BoK and GRCSE to INCOSE and the IEEE after BKCASE publishes version 1.0 of those products, including possible integration into their certification, accreditation, and other workforce development and education initiatives.

Status of GRCSE

Lead author: Tim Ferris
(author of this report)

GRCSE team composition

- *Rick Adcock, Cranfield University and INCOSE representative, UK*
- John Brackett
- *Joseph Ekstrom, Brigham Young University, USA*
- *Marcia Enos Lockheed Martin, USA*
- *Timothy Ferris, University of South Australia and INCOSE representative, Australia*
- Richard Freeman, Air Force Institute of Technology, USA
- *Thomas Hilburn, Embry-Riddle Aeronautical University, USA*
- Naohiko Kohtake, Keio University, Japan
- *Mary van Leer, Arkansas Scholarship Lottery, USA*
- *David Olwell, Naval Postgraduate School, USA*
- *Daniel Prun, Ecole Nationale de l'Aviation Civile, France*
- *Alice Squires, Stevens Institute of Technology, USA*
- *Massood Towhidnejad, Embry-Riddle Aeronautical University, USA*
- *Guilherme Travassos, Brazilian Computer Society, Brazil*

Actions to Date

- GRCSE team formation – BKCASE II Workshop, 31 March
- Teleconference meetings: 22 April, 6 May, 20 May, 3 June, 17 June (Adelaide time)
- Preparation of a survey of existing Masters programs in SE (SE-centric)
- Survey sent to at least 58 schools in Asia, Australia, Europe, North America and South America ^{al mazrouei}
- Responses have been received describing at least 26 programs
- Survey response data is in process of being organised into a spreadsheet
- Commencement of editing of GSWE2009 document (current state (16 June) of new content provided as separate pdf and doc)

Current Table of Contents (v0.25)

Title	Completion
Preface	80%
Acknowledgements	5%
Executive summary	25%
1. Introduction	0%
2. Guidance for the construction of GRCSE	90%
3. Expected objectives when a graduate has 3-5 years' experience	0%
4. Expected outcomes when a student graduates	0%
5. Expected student background when entering the master's program	0%
Curriculum architecture	0%

Title	Completion
7. Core body of knowledge (CorBOK)	0%
8. Assessment	0%
9. Anticipated GRCSE evolution	0%
App A. Summary of Graduate SE-centric SE programs in 2010	10%
App B. Bloom's taxonomy of educational objectives	90%
App C. Systems engineering competency frameworks	90%
App D. Untitled – probably Assessment and curriculum	0%
App E. GRCSE outcomes CorBOK mapping	0%
Glossary	0%
Index	0%

Issues Identified – Bloom's Taxonomy

- The Cognitive Domain has obvious application
- The Affective Domain would appear to be important, as a result of the identification in several competency frameworks of a combination of cognitive and leadership capabilities
 - We plan to consider this further to see where it takes us in relation to curriculum and assessment recommendations
- The Psychomotor Domain is currently discussed in an appendix
 - Systems engineers to make decisions about modes of use (and other interaction) with product systems
 - Systems engineers need to make decisions about maintenance etc
 - These responsibilities involve understanding of the products from a psychomotor perspective
 - This might make some aspects of the psychomotor domain relevant

Issues Identified – Competency Frameworks

- There are several competency frameworks for systems engineering
- The frameworks reflect:
 - The specific SE skills required for practice
 - Generic skills/abilities related to being a leader in engineering
 - Insight into technical issues
 - Abilities related to leading people
- The frameworks influence GRCSE through providing insight into the expectations of employers and professional societies concerning the outcomes and qualities required to attain the objectives of an SE program
- Question: How should Competency Frameworks be addressed in GRCSE (given that there is also a chapter related to Competency Frameworks in BKCASE SEBoK)?

Issues Identified – Range of Flavors of SE Programs

- SE Masters programs seem to come in a range of flavours
- These include:
 - Employer needs oriented
 - This includes the class of program which have been developed in close cooperation with particular employers to address their needs.
 - Designed to attract students ‘on-spec’
 - This class is structured to be attractive to engineers who are seeking to move into SE
 - Technical
 - These programs include advanced maths & statistics courses, various other technical courses, with the aim of educating to be able to do system level technical analysis
 - Management
 - These programs emphasize verbal description of SE subject matter, with heuristic description of SE and its impact, with the purpose of educating to be able to manage system development projects
- The diversity of the competency frameworks (which all reflect elements of these perspectives, but with a tendency to emphasize one or other seem to indicate different people fit different roles): This suggests each emphasis is ‘legitimate’

Issues Identified – Range of Flavors of SE Programs

- How does the BKCASE team believe this issue should be approached?
 - Attempt to define a single reference curriculum structure which fits all
 - This is likely to lose respect in the community and lead to an outcome which is not used
 - Construct multiple different reference curricula (one for each)
 - This is likely to present the perspectives as mutually exclusive and continue the sense that there is irreconcilable difference between the graduates of different programs
 - Construct a single set of knowledge areas with different levels of attainment, depending on the perspective of the program. This is likely to:
 - Highlight the essential unity across the field,
 - Accommodate more international perspectives, and
 - The fact that the differences are in emphasis (not irreconcilable)
 - Users would be challenged to target their program, and develop education which leads to the appropriate levels of attainment

Plans for GRCSE 0.25 (October 2010)

- 'Complete' the survey
 - Collate and write up the findings with respect to content areas and program outcomes
- Develop a statement of the CorBOK (Core Body of Knowledge)
 - Informed by BKCASE 0.25
 - Using the survey to check for items other educators have chosen to include which may not be in SEBOK. (If items are found, GRCSE with feedback to BKCASE-SEBOK)
- Develop levels of attainment of CorBOK elements and potential evidences of such attainment to be expected by graduates
- Develop an Appendix discussing the inter-relation of assessment methods, curriculum content and levels of attainment by students