BKCASE™

The Body of Knowledge and Curriculum to Advance Systems Engineering

Art Pyster & Nicole Hutchison
Stevens Institute of Technology
nicole.hutchison@stevens.edu

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Agenda

1. BKCASE background and objectives
2. Systems Engineering Body of Knowledge – What's in a Wiki?
3. Questions

How We Got Here

In Spring 2007, 3 phase effort was proposed:

1. A reference curriculum* for graduate software engineering with the “right” amount of systems engineering
2. A reference curriculum for graduate systems engineering with the “right” amount of software engineering
3. A fully interdisciplinary reference curriculum for systems and software engineering

*A reference curriculum offers recommendations on longer-term objectives for students, outcomes at graduation, entrance expectations, curriculum architecture, and required knowledge. Recommendations will be tailored. They do not specify course offerings or packaging except as examples.

You Are Here…

DONE	*Phase 1.*	A reference curriculum for graduate software engineering with the “right” amount of systems engineering
NOW	*Phase 2.*	A reference curriculum for graduate systems engineering with the “right” amount of software engineering
FUTURE	*Phase 3.*	A fully interdisciplinary reference curriculum for systems and software engineering

What is BKCASE?

- Project to create:
  - Systems Engineering Body of Knowledge (SEBoK)
  - Graduate Reference Curriculum in Systems Engineering (GRCSE™ – pronounced "Gracie")
- Started in September 2009
- Volunteer-based effort
- Project will run through 2012
- Intended for world-wide use

BKCASE 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 the SEBoK** and have it be **globally recognized** by the SE community as the authoritative guide to the body of knowledge for the SE discipline.
2. Create GRCSE and have it be 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 SEBoK 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.

BKCASE Author Team

Author, *Institution, Country*
Rick Adcock, *Cranfield University, UK*
Jim Anthony, *Sevatec, Inc., USA*
Erik Aslaksen, *Sinclair Knight Merz, Australia*
Richard Beasley, *Rolls Royce, UK*
Johan Bendz, *Bendz & Co., Sweden*
Barry Boehm, *University of Southern California, USA*
John Brackett, *University of Boston, USA*
Chuck Calvano, *Naval Postgraduate School, USA*
Aaron Eng Seng Chia, *Naval university of Singapore, Singapore*
Kyung-il Choe, *Hankuk University of Foreign Studies, South Korea*
Edmund Conrow, *Management and Technology Associates, USA*
Paul Croll, *CSC, USA*
Cihan Dagli, *Missouri University of Science and Technology, USA*
Judith Dahmann, *MITRE, USA*
Heidi Davidz, *UTC Pratt and Whitney, USA*

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(cont.)
Jeremy Dick, *Integrated Systems Engineering Ltd., UK*
Charles Dickerson, *Loughborough University, UK*
Dov Dori, Massachusetts *Institute of Technology, USA*
Joseph J. Ekstrom, *Brigham Young University, USA*
Marcia Enos, *Lockheed Martin, USA*
Dick Fairley, *Colorado Technical University, USA*
Alain Faisandier, *Association Francaise d'Ingenierie Systeme and MAP Systeme, France*
Tim Ferris, *University of South Australia, Australia*
Kevin Forsberg, *Center for Systems Management, USA*
G. Richard Freeman, *Air Force Institute of Technology, USA*
Sanford Friedenthal, *SAF Consulting*
Brian Gallagher, *Northrop Grumman, USA*
Tom Hilburn, *Embry-Riddle Aeronautical University, USA*
Nicole Hutchison, *Stevens Institute of Technology, USA*
Peter Jackson, *Cornell University, USA*

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(cont)

Scott Jackson, *University of Southern California, USA*

Mo Jamshidi, *University of Texas San Antonio, USA*

Cheryl Jones, *U.S. Army, USA*

Chul Whan Kim, *Korea National Defense University (KNDU), South Korea*

Naohiko Kohtake, *Keio University, Japan*

Harold “Bud” Lawson, *Lawson Konsult AB, Sweden*

Yeaw Lip “Alex” Lee, *Defence Science and Technology Agency, Singapore*

Ray Madachy, *Naval Postgraduate School, USA*

James Martin, *Aerospace Corporation, USA*

Greg Mayhew, *Boeing, USA*

Steve Mitchell, *Lockheed Martin, USA*

Ken Nidiffer, *Software Engineering Institute, USA*

Dave Olwell, *Naval Postgraduate School, USA*

Andrew Pickard, *Rolls-Royce, USA*

Ricardo Pineda, *Texas Technical University, USA*

Daniel Prun, *Ecole Nationale de l’Aviation Civile (ENAC), France*

Art Pyster, *Stevens Institute of Technology, USA*

Garry Roedler, *Lockheed Martin, USA*

Jean-Claude Roussel, *European Aeronautical Defence and Space Company (EADS), France*

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(cont.)
Hillary Sillitto, *Thales Group, UK*
John Snoderly, *Defense Acquisition University, USA*
Alice Squires, *Stevens Institute of Technology, USA*
Bill Stiffler, *Raytheon, USA*
Massood Towhidnejad, *Embry-Riddle Aeronautical University, USA*
Guilherme Horta Travassos, *Federal University of Rio de Janeiro (UFRJ), Brazil*
Ricardo Valerdi, *University of Arizona, USA*
Mary VanLeer, *Perceptive Systems, Inc., USA*
Qing Wang, *Institute of Software Chinese Academy of Sciences, China*
Brian Wells, *Raytheon, USA*
Mary Jane Willshire, *USA*
Brian White, *CAU<SES, USA*
Ken Zemrowski, *TASC, USA*

What is in GRCSE?

- ***Guidance for Constructing and Maintaining the Reference Curriculum:*** the fundamental principles, assumptions, and context for the reference curriculum authors
- ***Entrance Expectations:*** what students should be capable of and have experienced before they enter a graduate program
- ***Objectives:*** what students should be able to achieve 3 to 5 years after graduation based on what they learn in program
- ***Outcomes:*** what students should achieve by graduation
- ***Architecture:*** the structure of a curriculum to accommodate core material, university-specific material, and elective material
- ***Core Body of Knowledge:*** material that all students should master in a graduate SE program

Not specific courses. Not specific packaging. Adaption and selective adoption expected and encouraged.

SEBoK Purpose

To provide the boundaries, terminology, content, and structure needed to systematically and consistently *support* the following*:*

Purpose	Description
Inform Practice	Inform systems engineers about the boundaries, terminology, and structure of their discipline and point them to useful information needed to practice SE in any application domain
Inform Research	Inform researchers about the limitations and gaps in current SE knowledge that should help guide their research agenda
Inform Interactors	Inform performers in interacting disciplines (system implementation, project and enterprise management, other disciplines) of the nature and value of SE
Inform Curriculum Developers	Inform organizations defining the content that should be common in undergraduate and graduate programs in SE
Inform Certifiers	Inform organizations certifying individuals as qualified to practice systems engineering
Inform SE Staffing	Inform organizations and managers deciding which competencies that practicing systems engineers should possess in various roles ranging from apprentice to expert

Guide to the literature, not all the content of the literature

Who will use the SEBoK?

1. **Practicing Systems Engineers** – ID best references to support a new SE role; expand their areas of SE expertise and specialization; understand best SE practices in a project they are reviewing
2. **Process Engineers** – Understand which SE processes and assets are the most relevant; find examples in the literature of how others have tailored processes; find examples in the literature of how others have done self-assessed SE processes
3. **Faculty Members** – Decide on the core knowledge that all students in the program should master; incorporate SE concepts into non-SE courses or curricula
4. **GRCSE authors** - Decide what knowledge to expect from all SE graduate students
5. **Certifiers** - Understand what others have done, how such programs are typically structured, and how to select the knowledge that each person seeking certification should master

Who will use the SEBoK?

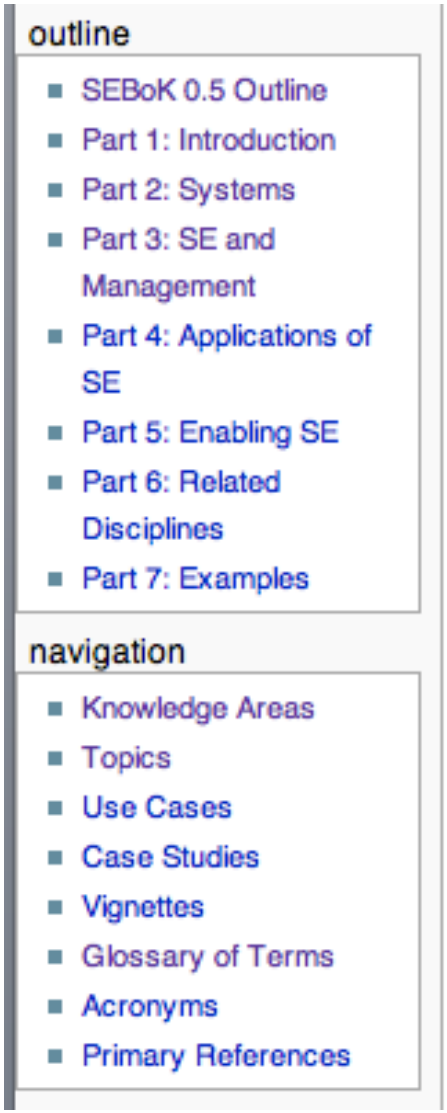
6. **General Managers, Other Engineers** - Understand the scope of SE relative to their roles; understand basic vocabulary, boundaries, and structure of SE and ID primary references; understand the role of the systems engineer versus others on a project
7. **Customers of Systems Engineering** – Better understand what to ask for, how to request it, and how to judge the quality of what is received
8. **SE Managers** – Read independent information to evaluate a proposal; develop competency-based job descriptions
9. **SE Researchers** - ID gaps in SE knowledge to guide research agendas

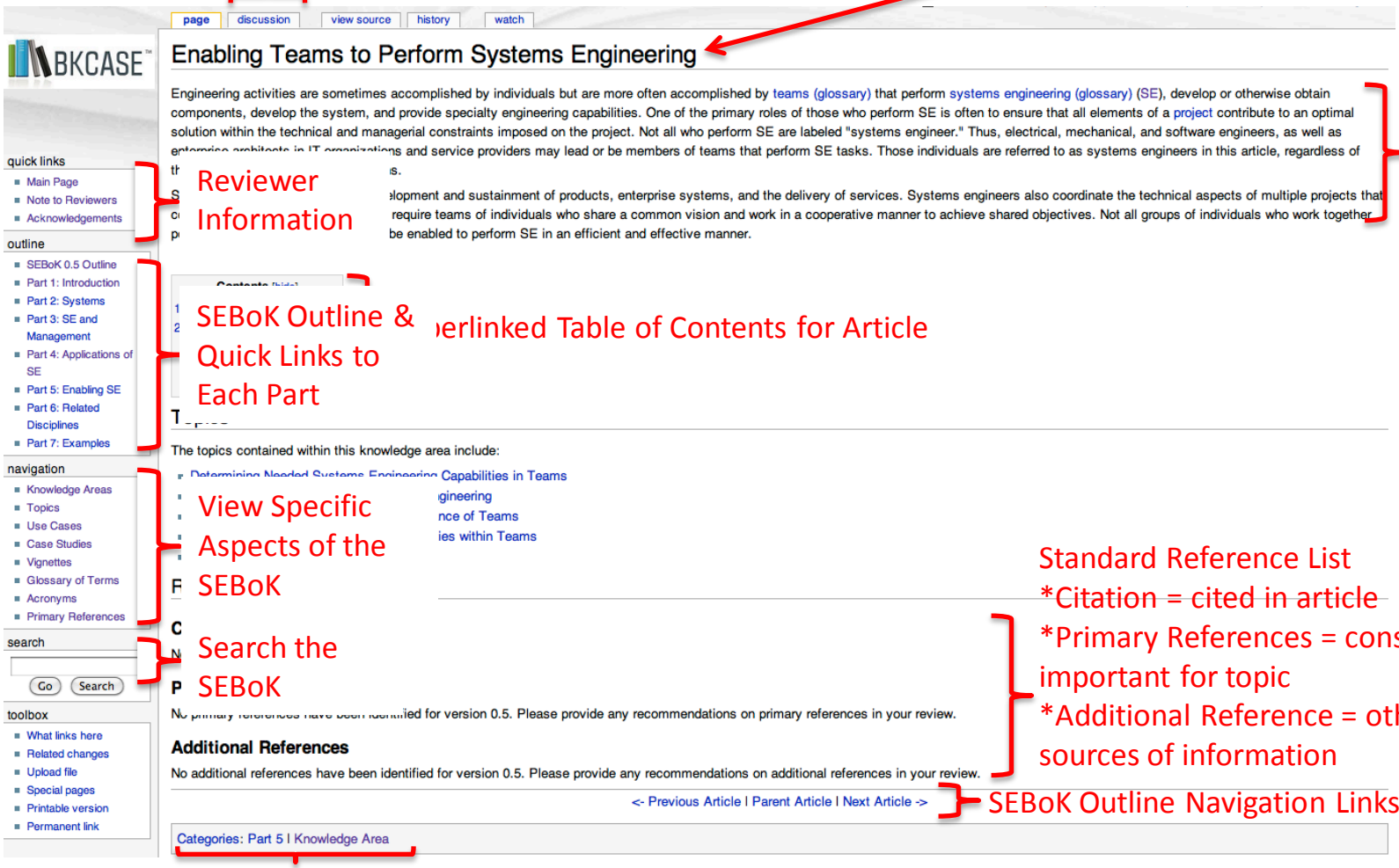
SEBoK Scope

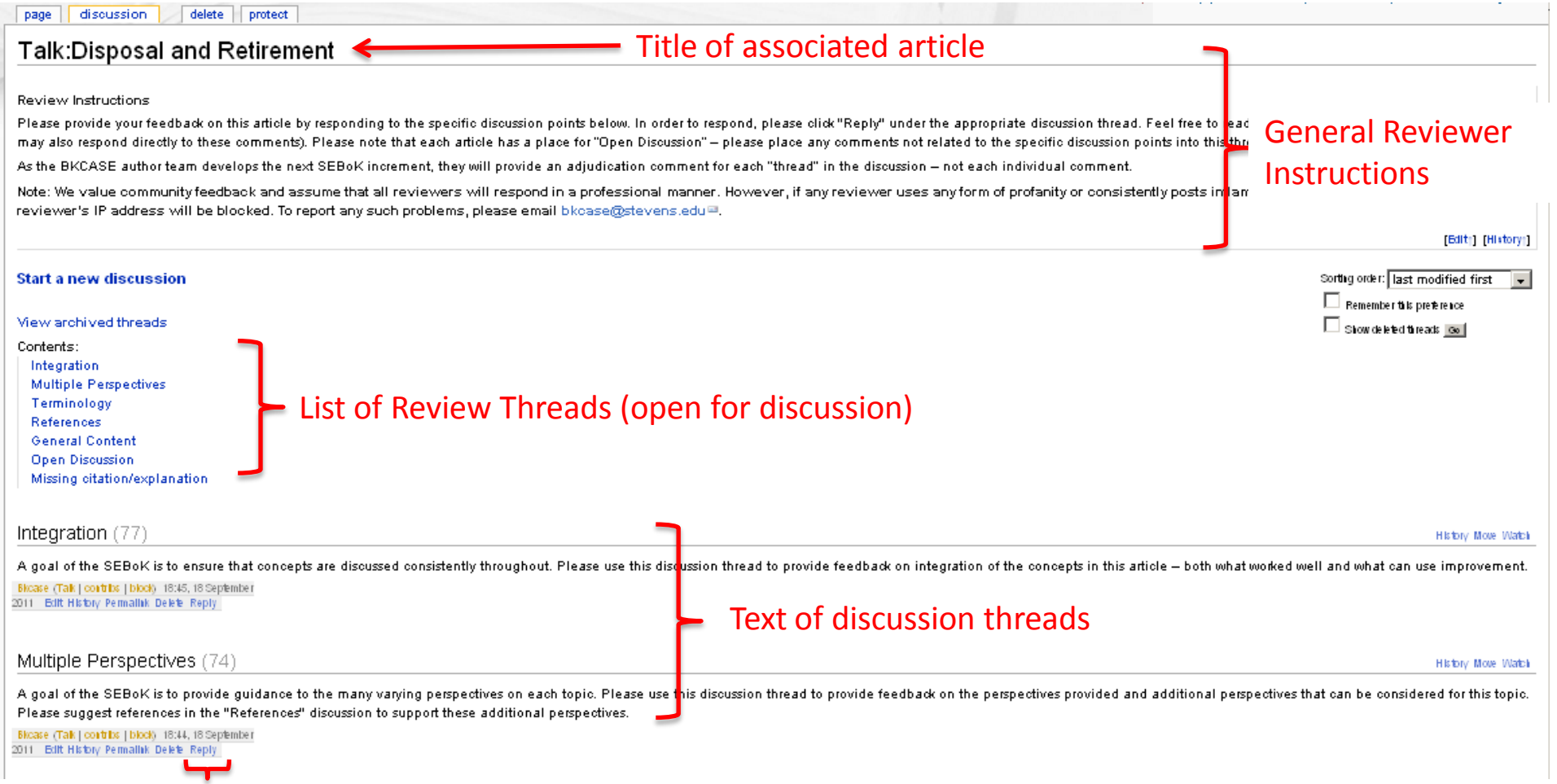
- Natural systems: Solar system, real number system
  - Not a concern of SEBoK, other than being external environments
- Engineered systems: Technical or sociotechnical aggregations of physical, informational, and human elements that exhibit emergent properties not exhibited by the individual elements
  - Created by and for people
  - Have a purpose, with multiple views
  - Satisfy key stakeholders' value propositions
  - Have a life cycle and evolution dynamics
  - Have a boundary and an external environment
  - Are part of a system-of-interest hierarchy

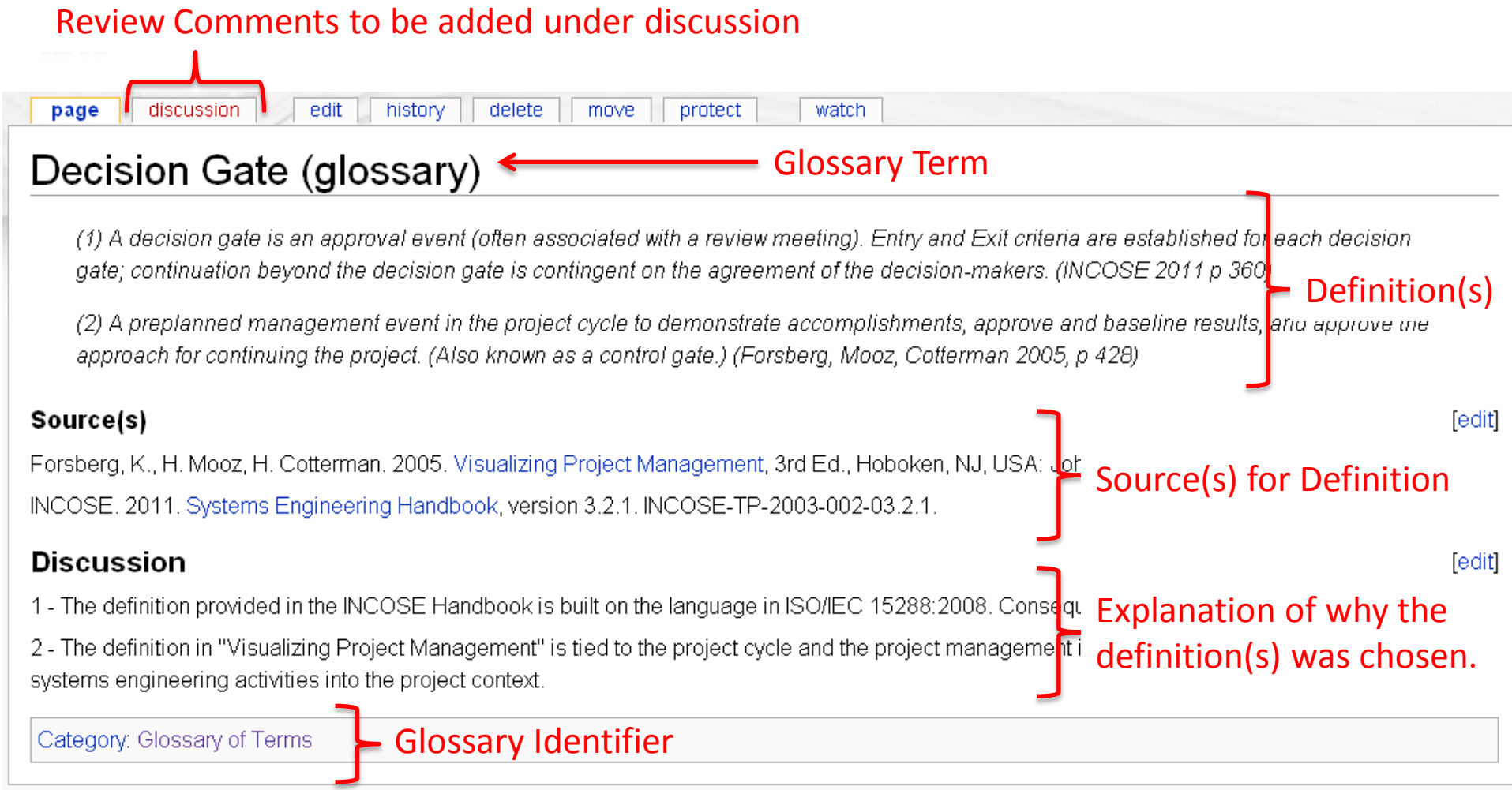
SEBoK 0.5 Organization

- Main Body
  - 7 Parts
  - 32 Knowledge Areas
  - 115 Topics
- Auxiliary
  - Glossary
  - Primary References




BKCASE
Click here to review
page
discussion
view source
history
watch
Enabling Teams to Perform Systems Engineering
Article Title (Subject)
Engineering activities are sometimes accomplished by individuals but are more often accomplished by teams (glossary) that perform systems engineering (glossary) (SE), develop or otherwise obtain components, develop the system, and provide specialty engineering capabilities. One of the primary roles of those who perform SE is often to ensure that all elements of a project contribute to an optimal solution within the technical and managerial constraints imposed on the project. Not all who perform SE are labeled "systems engineer." Thus, electrical, mechanical, and software engineers, as well as
Introduction
quick links
Main Page
Note to Reviewers
Acknowledgements
Reviewer Information
outline
SEBoK 0.5 Outline
Part 1: Introduction
Part 2: Systems
Part 3: SE and Management
Part 4: Applications of SE
Part 5: Enabling SE
Part 6: Related Disciplines
Part 7: Examples
SEBoK Outline & Quick Links to Each Part
navigation
Knowledge Areas
Topics
Use Cases
Case Studies
Vignettes
Glossary of Terms
Acronyms
Primary References
View Specific Aspects of the SEBoK
search
Go
Search
Search the SEBoK
toolbox
What links here
Related changes
Upload file
Special pages
Printable version
Permanent link
The topics contained within this knowledge area include:
Standard Reference List
*Citation = cited in article
*Primary References = considered very important for topic
*Additional Reference = other good sources of information
Additional References
No additional references have been identified for version 0.5. Please provide any recommendations on additional references in your review.
<- Previous Article | Parent Article | Next Article ->
SEBoK Outline Navigation Links
Categories: Part 5 | Knowledge Area
Outline information: Part the article belongs to; level of article (part, knowledge area, or topic)


page
discussion
delete
protect
Talk:Disposal and Retirement
Title of associated article
Review Instructions
Please provide your feedback on this article by responding to the specific discussion points below. In order to respond, please click "Reply" under the appropriate discussion thread. Feel free to
may also respond directly to these comments). Please note that each article has a place for "Open Discussion" – please place any comments not related to the specific discussion points into this
As the BKCASE author team develops the next SEBoK increment, they will provide an adjudication comment for each "thread" in the discussion – not each individual comment.
Note: We value community feedback and assume that all reviewers will respond in a professional manner. However, if any reviewer uses any form of profanity or consistently posts in
reviewer's IP address will be blocked. To report any such problems, please email bkcase@stevens.edu.
General Reviewer Instructions
[Edit] [History]
Start a new discussion
Sorting order: last modified first
Remember this preference
Show deleted threads
View archived threads
Contents:
Integration
Multiple Perspectives
Terminology
References
General Content
Open Discussion
Missing citation/explanation
List of Review Threads (open for discussion)
Integration (77)
History Move Watch
A goal of the SEBoK is to ensure that concepts are discussed consistently throughout. Please use this discussion thread to provide feedback on integration of the concepts in this article – both what worked well and what can use improvement.
Bkcase (Talk | contribs | block) 18:45, 18 September 2011 Edit History Permalink Delete Reply
Text of discussion threads
Multiple Perspectives (74)
History Move Watch
A goal of the SEBoK is to provide guidance to the many varying perspectives on each topic. Please use this discussion thread to provide feedback on the perspectives provided and additional perspectives that can be considered for this topic. Please suggest references in the "References" discussion to support these additional perspectives.
Bkcase (Talk | contribs | block) 18:44, 18 September 2011 Edit History Permalink Delete Reply
"Reply" to add comments on each discussion topic


Review Comments to be added under discussion
page
discussion
edit
history
delete
move
protect
watch
Decision Gate (glossary)
Glossary Term
(1) A decision gate is an approval event (often associated with a review meeting). Entry and Exit criteria are established for each decision gate; continuation beyond the decision gate is contingent on the agreement of the decision-makers. (INCOSE 2011 p 360)
(2) A preplanned management event in the project cycle to demonstrate accomplishments, approve and baseline results, and approve the approach for continuing the project. (Also known as a control gate.) (Forsberg, Mooz, Cotterman 2005, p 428)
Definition(s)
Source(s)
[edit]
Forsberg, K., H. Mooz, H. Cotterman. 2005. Visualizing Project Management, 3rd Ed., Hoboken, NJ, USA: Joh
INCOSE. 2011. Systems Engineering Handbook, version 3.2.1. INCOSE-TP-2003-002-03.2.1.
Source(s) for Definition
Discussion
[edit]
1 - The definition provided in the INCOSE Handbook is built on the language in ISO/IEC 15288:2008. Consequ
2 - The definition in "Visualizing Project Management" is tied to the project cycle and the project management i
systems engineering activities into the project context.
Explanation of why the definition(s) was chosen.
Category: Glossary of Terms
Glossary Identifier

Review Comments to be added under discussion

page | discussion | edit | history | delete | move | unprotect | watch

IEEE 1471 ← Reference Title

ANSI/IEEE. 2000. *Recommended practice for architectural description for software-intensive systems*. New York, NY: Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE), ANSI/IEEE 1471-2000.

Bibliographic Entry

May also be referred to as *ANSI/IEEE 1471*.

Annotation [edit]

System Modeling Concepts

This reference is widely recognized as a foundational standard for defining modeling concepts, particularly as it rel and general architecture description.

Modeling Standards

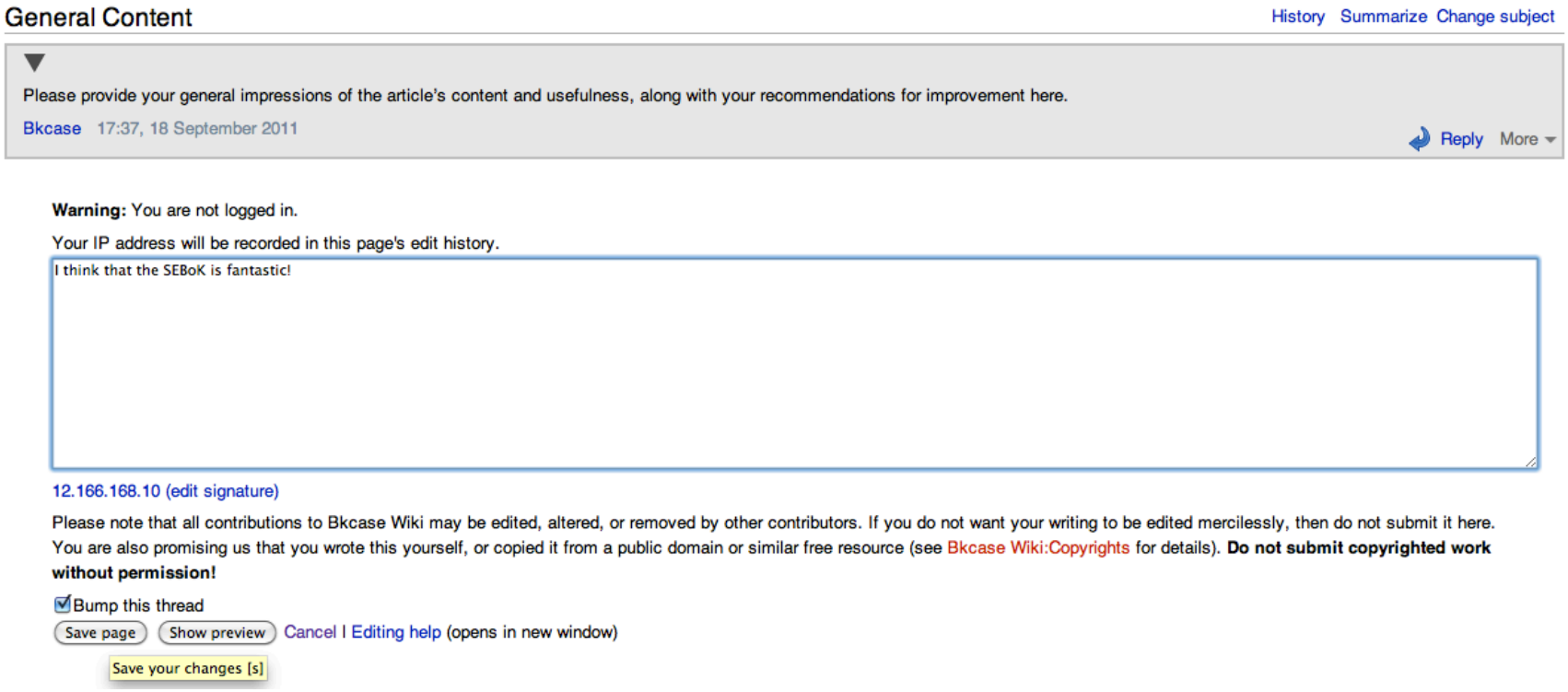
Annotation to be added for SEBoK 1.0.

Listing of Articles which use as a primary reference, with annotations for each article

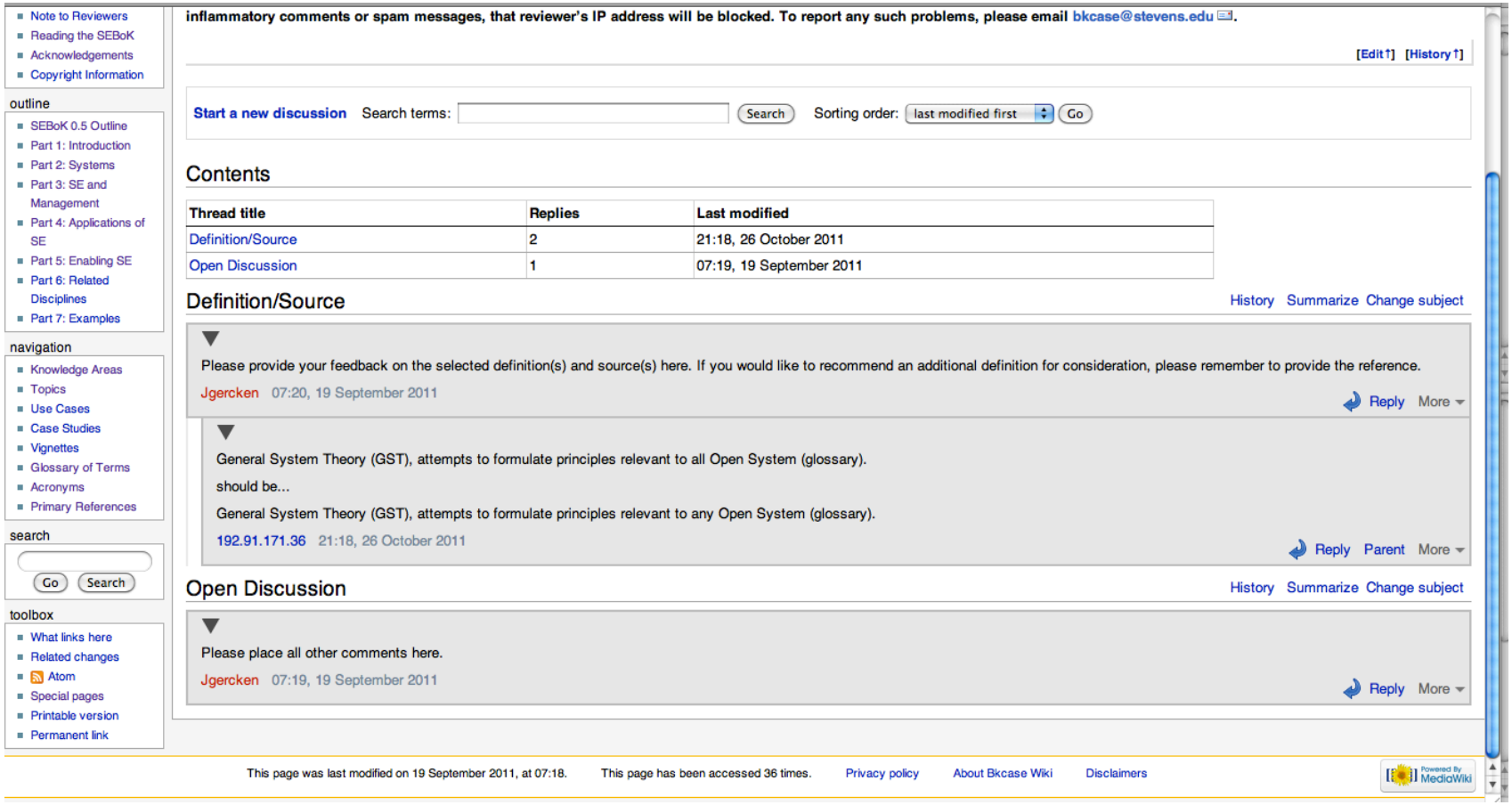
Category: Primary Reference

Primary Reference Identifier

Screen Shot of Review



Screen Shot of Review (2)



SEBoK 0.5 Wiki Outreach Sessions

- To help orient the community to the wiki delivery of the SEBoK, the BKCASE team has planned 3

Flyers with additional information on the wiki outreach/review sessions available (just raise your hand)!

- Sessions to be held Nov 7-9
- For additional details or to register for a session, please email bkcase@stevens.edu

BKCASE™

Our Supporters

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Backup

Phase 1 Primary Products

- Graduate Software Engineering 2009 (GSwE2009): Curriculum Guidelines for Graduate Degree Programs in Software Engineering
- GSwE2009 Companion Document: Comparisons of GSwE2009 to Current Master's Programs in Software Engineering
- GSwE2009 Companion Document: Frequently Asked Questions on Implementing GSwE2009


iSSEc

Integrated Software & Systems Engineering Curriculum (iSSEc) Project

Graduate Software Engineering 2009(GSwE2009)

Curriculum Guidelines for
Graduate Degree Programs in Software Engineering

GSwE 2009

Version 1.0

September 30, 2009

Unlimited Global Distribution

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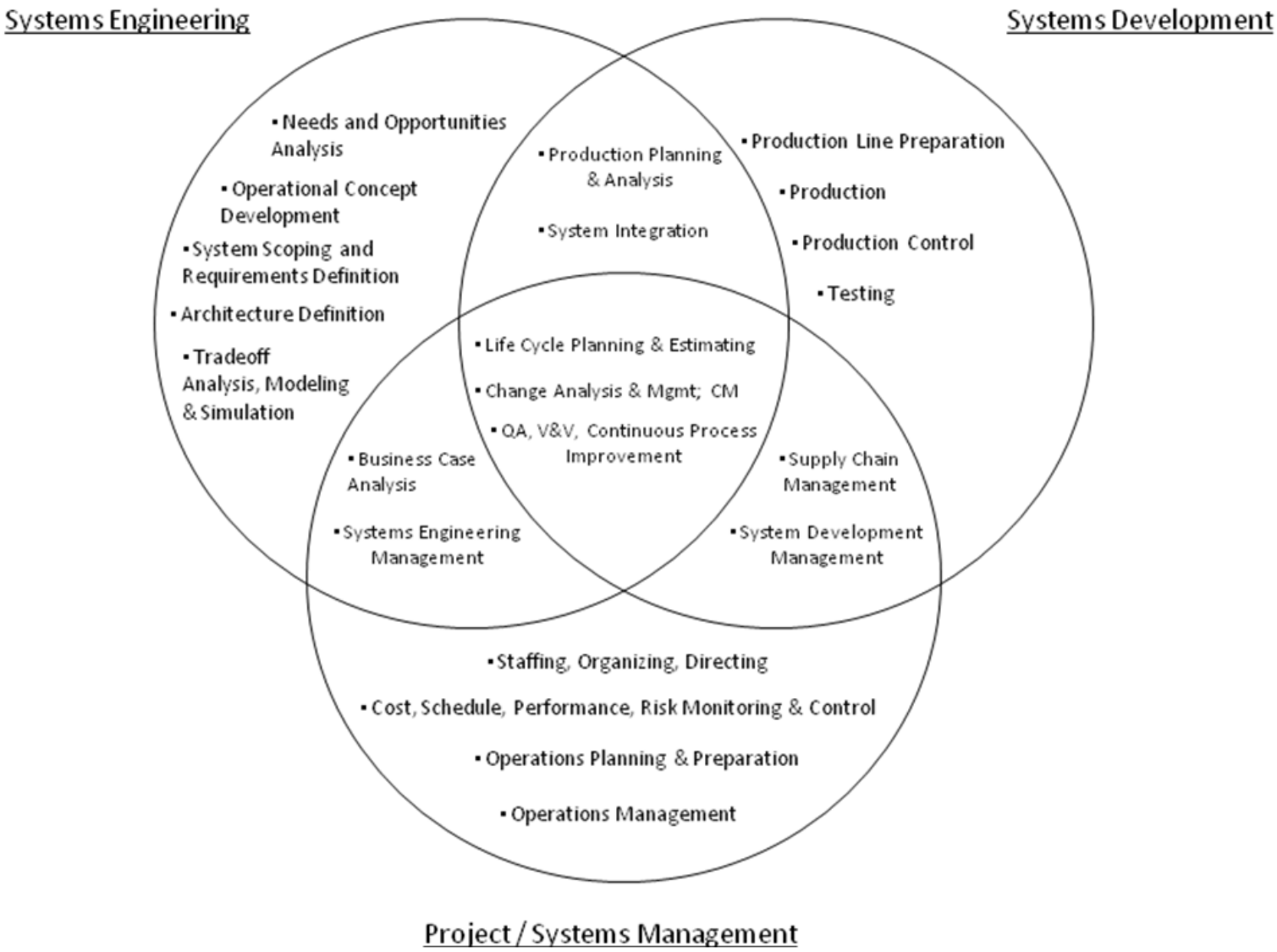
www.GSwE2009.org

SE, Development, Management



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1. Products generated by the authors, not the sponsor or supporters
2. Even though the Department of Defense is the sponsor, it does not have any authority over the content of the products, nor are the products slanted towards defense systems development and acquisition
3. Volunteer authors do the bulk of the writing
4. Core Team from Stevens and Naval Postgraduate School provides stable labor and direction
5. Core Team responsible for final integration, technical editing, and clean up of products

SEBoK 0.25 Organization

- **Part 1: SEBoK 0.5 Introduction.**
- **Part 2: Systems.**
- **Part 3: Systems Engineering and Management.**
- **Part 4: Applications of Systems Engineering.**
- **Part 5: Enabling Systems Engineering.**
- **Part 6: Related Disciplines.**
- **Part 7: Systems Engineering Implementation Examples.**

Systems Engineering Defined

- INCOSE
  - Interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, **then** proceeding with design synthesis and system validation while considering the complete problem

- Possible Alternative
  - Interdisciplinary approach and means to enable the realization of successful systems. It focuses on holistically and concurrently understanding stakeholder needs, exploring opportunities, documenting requirements, and synthesizing, verifying, and validating solutions