SEBOK Panel Discussion
NDIA SE Conference
25-28 October 2010

Mr. Garry Roedler, ESEP
Lockheed Martin Corporation

Dr. Don Gelosh, CSEP-Acq
ODDR&E/Systems Engineering

Dr. John R. Snoderly, D.P.A., CSEP
Defense Acquisition University

13th Annual NDIA Systems Engineering Conference
San Diego, CA | October 27, 2010

SEBoK Value Proposition

1. There is no authoritative source that defines and organizes the knowledge of the SE discipline. Knowledge gap creates unnecessary inconsistency and confusion in understanding the role of SE and in defining SE products and processes.

2. Creating the SEBoK will help build community consensus on the boundaries of SE, including its entanglements with project management and software engineering.

3. A common way to refer to SE knowledge will facilitate communication among systems engineers and provide a baseline for competency models, certification programs, educational programs, and other workforce development initiatives around the world.

4. Common ways to identify metadata about SE knowledge will facilitate search and other automated actions on SE knowledge.

Industry Motivations

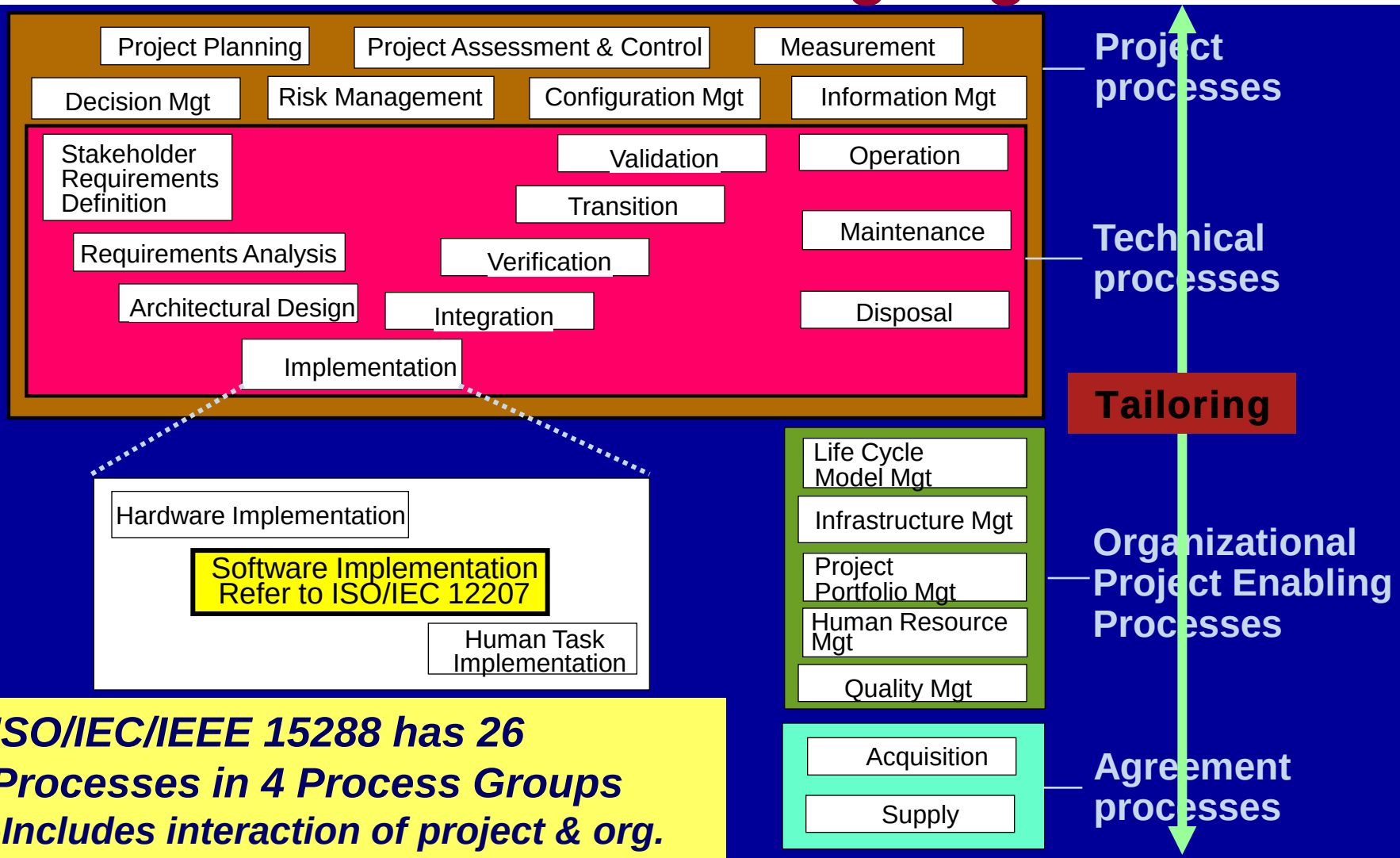
- Recognized authoritative SE reference
  - Common terminology, concepts, processes, methods, techniques, etc.
  - Built on leading sources, proven experience, and lessons learned
  - Easy to access and tailor to meet project/organization needs
- Breadth and depth
  - Full life cycle coverage – should reduce risk across the life cycle
  - Products, systems, system of systems, services and enterprise
- Common basis for:
  - Establishing boundaries of SE and integration with other disciplines
  - SE education/training, development and certification
  - SE improvement:
    - Communication and integration
    - Quality of the product
    - Productivity
    - Customer satisfaction

SEBoK Content

1. The definition of fundamental terms and concepts and primary relationships between those concepts
2. A statement of the principles of SE
3. A description of generally accepted activities, practices, technologies, processes, methods, and artifacts of SE and how they relate to one another
4. How the knowledge of SE varies within individual application domains such as medicine, transportation, and telecommunications
5. References to books, articles, websites, and other sources that elaborate on the information in the SEBoK
   - Strongly leverages ISO/IEC 15288, INCOSE SE Hdbk & SEVOCAB

Version 0.25 released for review in September 2010

ISO/IEC/IEEE 15288 Structure Used as Starting Organization



ISO/IEC/IEEE 15288 has 26 Processes in 4 Process Groups
-Includes interaction of project & org.

Source: Adapted from ISO/IEC JTCI/SC7/WG7 presentation on ISO/IEC 15288.

Author objectives established

- Written to be a guide to the body of knowledge
  - Organizes the knowledge in a useful manner
  - Not intended to contain the full extent of the discipline
  - Not intended to create new knowledge or value-added to the literature
- Descriptive rather than prescriptive
  - Recognize the diverse ways in which the community successfully approaches SE
  - Point the reader to literature in the industry for more detail – references should be noteworthy contributions to the topic
- Define ties to closely related disciplines
  - Especially software engineering and project management
- Domain independent
  - Domain dependent aspects will be covered in Case Studies
- Consider broader scope
  - Products, systems, system of systems, services, and enterprise
  - Global view

Content for Each Section

- Includes process, but NOT JUST process!
- Also includes:
  - Terms & definitions
  - Principles & Concepts
  - Guidance
  - Methods and techniques (multiple where applicable)
  - Good practice and Pitfalls
  - Linkages with other KAs and/or Topics
  - Application information
  - References
- Not a self-contained reference or all-inclusive compendium
  - Organizes the knowledge across industry – more of a guide to the knowledge
  - Provides abstract level information to describe topics/subtopics
  - Provides links to references with detailed level information
    - Not all-inclusive; not just freely available

Example of KA Development

- Mapped Technical KA against ISO/IEC/IEEE 15288 as starting point
- Identified other relevant knowledge
- Technical KA later divided into multiple KAs due to size and relationship of activities
  1. System Definition (Mission Analysis, Stakeholder Reqts, System Reqts, Architectural Design, Systems Analysis)
  2. System Realization (Implementation, System Integration, System V&V)
  3. System Deployment and Use (Transfer for Use/Deployment, Operation, Maintenance, Logistical Support)
  4. System Life Management (Service Life Extension, Update/Upgrade, Disposal or Retirement)
- Established detailed outline for each KA
- Decided to put ‘ilities/quality characteristics in separate KA

Mapping: ISO/IEC 15288 Technical processes – Technical KA

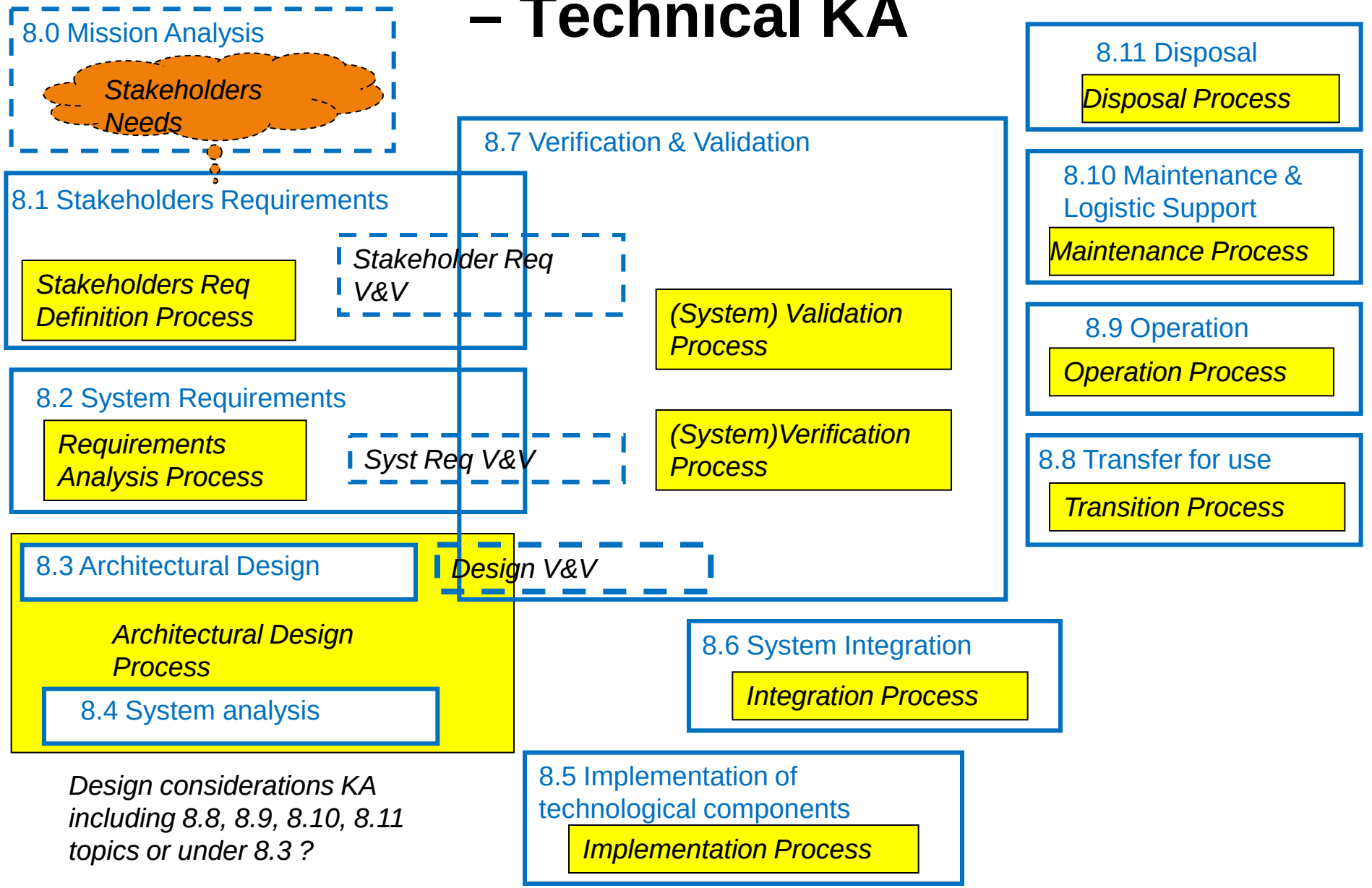


Table of Contents

Example of Topic Development

- System Requirements
  - Determined scope together with other System Definition topics
    - Principles
      - Translation of Stakeholder Requirements into System Requirements
      - Traceability and Allocation of System Requirements
      - Classification of System Requirements
    - Process Description
      - Purpose of process
      - Major activities and tasks
    - Typical Artifacts
    - Ontology Elements
    - Checking and Correctness of System Requirements
    - Methods and Modeling Techniques
      - Requirements Elicitation and Prototyping
      - Capturing Requirements Rationale
      - Modeling Techniques
      - Presentation and Quality of Requirements
    - Typical Measures
  - Expanded scope based on leading references

Example of Topic Development

- System Requirements (Cont;d)
  - Primary references:
    - ISO/IEC 15288, System Life Cycle Processes (2008)
    - INCOSE Systems Engineering Handbook, Version 3.2
    - ISO/IEC 29148, Requirements Engineering (Draft - 2010)
    - Requirements Engineering (2009 – van Lamsweerde)
    - Engineering and Architecting Multi-disciplinary Systems (Draft - Faisandier)
    - Customer-centered products: Creating successful products through smart requirements management (2000 - Hooks & Farry)
    - Systems Engineering Leading Indicators (2010 - Roedler, et al.)

NDIA
National Defense Industrial Association

For Additional Information:

Dr. John R. Snoderly
Defense Acquisition University
john.snoderly@dau.mil

Mr. Garry Roedler
Lockheed Martin Corporation
garry.j.roedler@lmco.com

Dr. Don Gelosh
ODDR&E/Systems Engineering
donald.gelosh@osd.mil

AFEI nTsa PSA WIDS

Back-up Charts

BKCASE Vision and Objectives

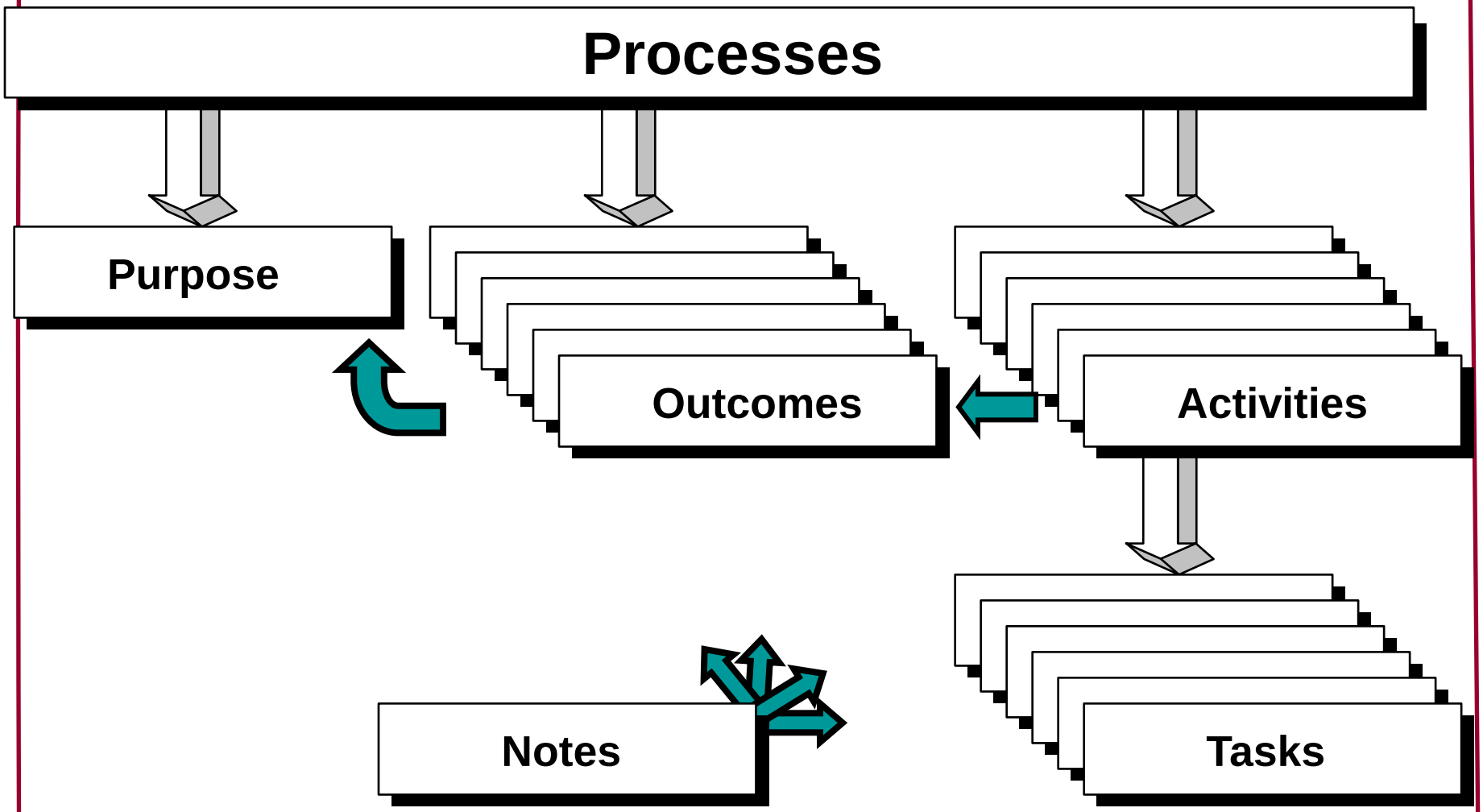
Vision

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

Objectives

1. Create 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 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.

ISO/IEC/IEEE 15288 Process Structure



Purposes and Outcomes are Normative