


Outline for Proposed Presentation in South Africa, October 2016 (KJF) as of 27 March 2016

# Introduction Systems Engineering in 2016



**South Africa**  
**Dr. Kevin Forsberg, INCOSE Pioneer, Fellow, and ESEP**


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Visualizing Project Management  
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Day One	Day Two
0 – Introduction & SE References	4 – SE Processes & Functions
1 – Mission & System Architecture	5 – Concept of Ops (CONOPS, OPSCON)
2 – Requirements Engineering	Discussion of WIRE Case Study
Exercise – Requirements Best Practices	6 – Making Decisions
3 – Principle of Concept Selection...	7 – Capability Based Acquisitions
Discussion of FRR Case Study	Decision Analysis Exercise (House Buy)


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**Instructor Résumé – Kevin Forsberg**

**Experience Summary**

Dr. Forsberg has been teaching with Airbus (Astrium and Cassidian) SEQ program since September 11, 2001.

Dr. Forsberg draws on 27 years of industrial experience in systems engineering, project, and proposal management, and 33 years of successful consulting to both government and industry. His experience ranges from research projects, to development efforts, through to full-scale production implementation. Since 1983 he has provided training and consulting to both government and commercial clients. He specializes in systems, hardware and software project management, and the related processes, techniques, and skills essential to achieving predictable project performance. Dr. Forsberg has presented one- to two-week seminars in over a dozen countries.

**Career Highlights:**

- Early member of the Lockheed Corona Project, America's first successful satellite (1956-61).
- US Army Corps of Engineers active duty (1961-63) during the Berlin wall crisis
- On loan from the army to NASA-Ames Research Center during Apollo project (1962-63)
- Manager, Solid Mechanics Laboratory, Lockheed Research Lab, Palo Alto, CA (1964-68)
- Deputy Director, Materials & Structures, Lockheed Research Lab, Palo Alto, CA (1968-70)
- Lockheed Program Manager of the Space Shuttle tile project for seven years, from research through full-scale production (1971-1978).
- Lockheed new business division, proposal manager on major bids (1978-80)
- Lockheed Program Manager of the Space Station Program (1980-83).
- VP, then president, Consulting Resources Inc (CRI) (1983-89)
- Co-founder of and active participant in two consulting and training firms: Center for Systems Management (1989 - 2011) and OGR (2012 - present)



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**Instructor Résumé (Continued) – Kevin Forsberg**

**Publications and Technical Activity:**

- Co-author of *Visualizing Project Management*, J. Wiley & Sons, (1<sup>st</sup> ed-1996, 3<sup>rd</sup> ed-2005). (Available in English, Finnish, Arabic, and Chinese)
- Co-author of *Communicating Project Management*, J. Wiley & Sons, 2002.
- Co-editor and contributing author, *INCOSE SE Handbook*, v 2a (2004), 3.0, 3.1, 3.2, 4.0 (2015)
- Co-editor and contributing author, *SEBoK (SE Body of Knowledge)*, v1, [www.sebok.wiki](http://www.sebok.wiki), (2012)
- Author of the **Vee chart** and its elaborations (1989 to present)
- Author of over 30 technical papers in ASME, AIAA, and INCOSE conferences and journals.
- Chair and Co-chair of **Certification Advisory Group (CAG)**; Created the **CSEP** and **ESEP** programs (2003-2010)
- Chair, **INCOSE Knowledge Management Working Group** (2009-present)
- Co-Chair, **Agile Systems Engineering Working Group**, INCOSE (2015-present)

**Awards**

- Fellow, American Society of Mechanical Engineers (ASME) (1973)
- NASA Public Service Medal (1981) "in recognition of his outstanding technical and managerial contributions to the Space Shuttle Program."
- CIA Seal Medallion for excellence in Project Management training, and in recognition of his pioneering efforts in the field of Project Management (1998).
- INCOSE Pioneer (2001), INCOSE Fellow (2006), INCOSE CSEP (2004) and ESEP (2010)

**Education**

- Ph.D., Engineering Mechanics, Stanford University (1961)
- M.S., Engineering Mechanics, Stanford University (1958)
- B.S., Civil Engineering, Massachusetts Institute of Technology (1956)
- Certificate, Stanford Executive Sloan Program, Stanford School of Business (1979)



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## Session 1 Mission and System Architecture Analysis

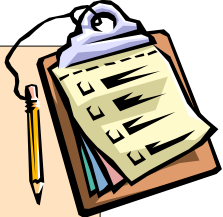


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### Session Learning Objectives



Upon mastering this session you will be able to:

- Explain mission and system architecture analyses as an “end-to-end” task
  - Involving different levels of system trades
  - Involving in-process opportunity and risk assessments
- Describe the relevance of the Vee model in guiding mission and architecture studies, and overall project evolution and delivery
- Be alert to Agile and Scrum Product Development Environment
- Explain the importance of early high-level configuration management



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## Session 2 Requirements Engineering




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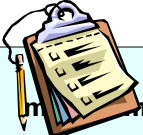
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## Learning Objectives

By mastering this module, you will be able to:

- Discuss the requirements development and process
- Develop solution concepts using a trade study process
- Direct allocation of system requirements to lower level entities
- Manage requirements traceability and accountability throughout the requirements management process
- Explain how to integrate, verify, and validate your solution to ensure customer satisfaction
- Explain the role of the project manager, the customer, and the project team in the requirements management process.
- Convey the importance of successive freezing/ configuration control of technical and programmatic requirements




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## Session 3 Principles of Concept Selection and Customer Orientation



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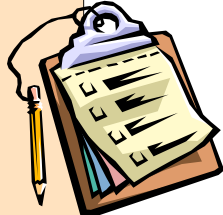
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## Session Learning Objectives

Upon mastering this session you will be able to:

- Describe the principles of concept selection and customer orientation as they evolve during the project life-cycle
- Explain the role of Systems Engineers in:
  - Developing new missions
  - Developing new services concepts
  - Responding to RFPs
  - Supporting initial study and implementation phases
- Identify the important drivers in developing responsive architectures





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## Session 4 SE Processes, Functions, and Performance




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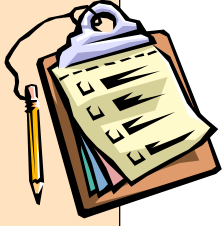
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### Session Learning Objectives

Upon mastering this session you will be able to:

- Describe the Systems Engineering Process to determine function and performance needs
- Explain incremental and modular design
- Apply evolutionary development concepts
- Address re-useability
- Know key characteristics of principle SE tools in use
- Explain the importance of Configuration Management (CM) and its driving principles
- Apply appropriate CM tailoring to project needs





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## Session 5

# Concept of Operations (ConOps) and Operational Concept (OpsCon)




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## Session Learning Objectives

By mastering this session you will be able to:

- Describe the importance of ConOps for System Development
- Explain different types of *OpsCon* (for design, production, deployment, use, support, disposal)
- Identify who shall write the ConOps or OpsCon
  - Customer
  - User
  - Operational advisor
  - System Engineer
- Discuss who the customers are for the ConOps and OpsCon
- Discuss the means for control of the ConOps family




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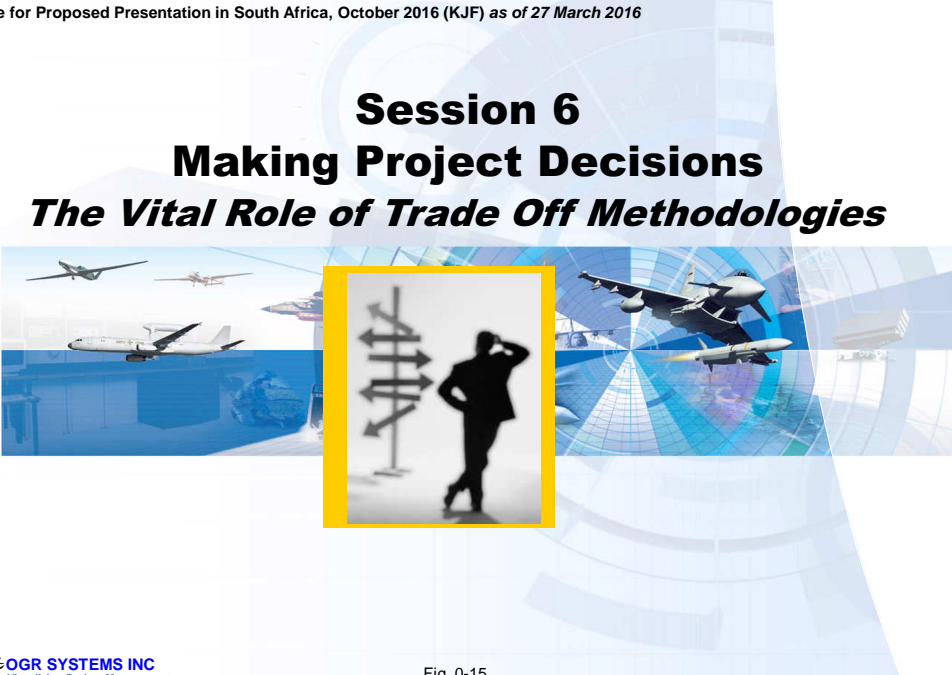
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## Session 6

# Making Project Decisions

### *The Vital Role of Trade Off Methodologies*



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## Session Learning Objectives

By mastering this session you will be able to:

- Describe the importance of sound (good) decisions to your situation
- Become decision fit (capable of making good decisions)
- Recognize flawed decision making
- Identify different decision types
- Create decision making criteria
- Decide on the proper basis for making good decisions
- Implement several decision support processes
- Apply “other factors analysis” to the decision process
- Make informed decisions that can be defended



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**“When you Really Must Win ...”**

**Session 7**

**Capability-Based Acquisition Concepts**



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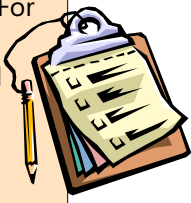
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**Session Learning Objectives**

**Upon mastering this session you will be able to:**

- Describe the role of Systems Engineering in pre-Request For Proposal (pre-RFP) studies
- Describe the importance of pre-RFP solution concept and related cost models
- List, organize, and complete the first five critical tasks in preparing to respond to the RFP
- Explain the functions of the proposal “Red Team” and other contractor bid and proposal evaluation teams
- Explain the role reversal when your company is the buyer (as Customer for your subcontractors)
- Describe one key approach in Decision Making
- Describe the importance of the way in which you present data supporting your approach.




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## End of Session



Exit  
Slide Show


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