



Fundamentals of Systems Engineering

A 2-Day Practical Workshop

The Basics of Creating Successful Systems

Today's complex systems present difficult challenges to develop. From military systems to aircraft to environmental and electronic control systems, development teams must face the challenges with an arsenal of proven methods. Individual systems are more complex, and systems operate in much closer relationship, requiring a system-of-systems approach to the overall design.

This workshop presents the fundamentals of a *systems engineering* approach to solving complex problems. It covers the underlying attitudes as well as the process definitions that make up systems engineering. The model presented is a research-proven combination of the best existing standards.



Participants in this workshop practice the processes on a realistic system development.

You should attend this workshop if you are:

- Working in any sort of system development
- Project leader or key member in a product development team
- Looking for practical methods to use today

The course is aimed at

- Project leaders,
 - Technical team leaders,
 - Design engineers, and
 - Others participating in system development
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Topics Covered in the Course

Systems Engineering Model – An underlying process model that ties together all the concepts and methods. System thinking attitudes. Overview of the systems engineering processes. Incremental, concurrent processes and process loops for iteration. Technical and management aspects.

Where Do Requirements Come From? – Requirements as the primary method of measurement and control for systems development. Three steps to translate an undefined need into requirements; determining the system purpose/mission from an operational view; how to measure system quality, analyzing missions and environments; requirements types; defining functions and requirements.

Where Does a Solution Come From? – Designing a system using the best methods known today. What is an architecture? System architecting processes; defining alternative concepts; alternate sources for solutions; how to allocate requirements to the system components; how to develop, analyze, and test alternatives; how to trade off results and make decisions. Establishing an allocated baseline, and getting from the system design to the system. Systems engineering during ongoing operation.

Ensuring System Quality – Building in quality during the development, and then checking it frequently. The relationship between systems engineering and systems testing. Technical analysis as a system tool. Verification at multiple levels: architecture, design, product. Validation at multiple levels; requirements, operations design, product.

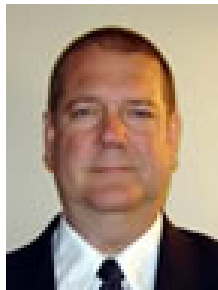
Systems Engineering Management – How to successfully manage the technical aspects of the system development; planning the technical processes; assessing and controlling the technical processes, with corrective actions; use of risk management, configuration management, interface management to guide the technical development.

Systems Engineering Concepts of Leadership – How to guide and motivate technical teams; technical teamwork and leadership; virtual, collaborative teams; design reviews; technical performance measurement.

Summary - Review of the important points of the workshop. Interactive discussion of participant experiences that add to the material.

The Instructors

Mr. Eric Honour has been in international leadership of the engineering of systems for over a decade, part of a 38-year career of complex systems development and operation. His energetic and informative presentation style actively involves class participants. He is a former President of the International Council on Systems Engineering (INCOSE). He was selected in 2000 for Who's Who in Science and Technology and in 2004 as an INCOSE Founder. He has been a systems engineer, engineering manager, and program manager at Harris, E-Systems, and Link, and was a Navy pilot. He has contributed to the development of 17 major systems, including Air Combat Maneuvering Instrumentation, Battle Group Passive Horizon Extension System, and National Crime Information Center. BSSE (Systems Engineering) from US Naval Academy and MSEE from Naval Postgraduate School.



Dr. Scott Workinger has led innovative technology development efforts in complex, risk-laden environments for 30 years in the fields of manufacturing (automotive, glass, optical fiber), engineering and construction (nuclear, pulp & paper), and information technology (expert systems, operations analysis, CAD, collaboration technology). He currently teaches courses on program management and engineering and consults on strategic management and technology issues. Scott has a B.S in Engineering Physics from Lehigh University, an M.S. in Systems Engineering from the University of Arizona, and a Ph.D. in Civil and Environment Engineering from Stanford University.