



Requirements Development

A Workshop in Two Days

Requirements as an Engineering Tool

One of the most significant impacts a systems engineer can have on a project is to ensure the successful identification, analysis and allocation of requirements. This course provides both lecture and practical work on the creation and use of requirements in a system development.



The course begins with an overview of the purpose and use of requirements. It identifies the sources and types of requirements, including the processes to work from operational definitions into technical requirements. A process for conducting a requirements analysis is presented along with exercises of several requirements analysis methods. It includes techniques to allocate the requirements to the system architecture. Source documents for guidance on drafting requirements documents are also presented along with some of the common software tools used to support requirements analysis and allocation.

The proper use of requirements is one of the core tools of complex systems engineering. From beginning to end, good systems engineers use requirements as the primary definition for the system and its elements, to help the product system:

- Meet the operational and customer needs
- Fit within the intended system environment
- Provide sufficient robustness and reliability
- Offer appropriate flexibility
- Meet the entire life cycle

Practice all the methods in collaborative work on a creative system exercise. Define and quantify the operational need, write requirements, do graphical requirements analysis, and allocate the requirements into an architecture..

You should attend this tutorial if you are:

- A leader or a key member of a system development team
- Involved in the operational or technical definition of the product system.
- Looking for practical methods to use today

The course is aimed at

- Systems engineers,
 - Design engineers,
 - Logistic support leaders, and
 - Others who participate in defining and developing complex systems.
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Topics Covered in the Course

Requirements Overview – What are requirements and how do they fit in to system development? Context of system development models. Role of requirements. Importance of requirements.

Defining the Need – Defining the basic steps in understanding a new system. How to define the need in operational terms. What to do with the operational descriptions. How to quantify the need to allow effective trade offs in the later engineering effort. Application of UML diagrams (Use Case, Activity) for operational definition.

Defining Requirements – How to convert operational descriptions into technical requirements. Mission analysis as an engineering technique. The roles of functions and functional analysis. Documentation methods for both contracted (one customer under contract) and product (commercially developed) systems. Specification writing methods and rules. New forms of requirements in agile and extreme development.

Requirements Analysis – Methods to ensure that systems requirements are complete, coherent, and cohesive. Diagramming techniques for functional flow block diagrams, structured analysis (data flow diagrams), real time state space analysis, behavior analysis, object oriented analysis, and IDEF diagramming. Introduction to UML and its use for requirements analysis. Strengths and weakness of each method. Class exercises in several.

Requirements Allocation – Requirements as engineering tools during the system architecting and design phases. Allocation methods with examples – direct allocation, apportionment, derivation. Application of requirements management techniques to handle continuous change.

Case Study – Small-group study of a virtual development project in four segments to apply the learned methods. Defining the need; Writing requirements; Requirements analysis; Requirements allocation.

Requirements Tools – Survey of the currently available software tools to assist in requirements analysis, allocation and management.

The Presenter:

Mr. Eric Honour has been in international leadership of the engineering of systems for a dozen years, part of a 37-year career of complex systems development and operation. His energetic and informative presentation style actively involves class participants. He was the founding Chair of the INCOSE (International Council on Systems Engineering) Technical Board in 1994, was elected to INCOSE President for 1997, and served as Director of the Systems Engineering Center of Excellence (SECOE). He was selected in 2000 for Who's Who in Science and Technology and in 2004 as an INCOSE Founder. He is on the editorial board for *Systems Engineering*. He has been a systems engineer, engineering manager, and program manager at Harris Information Systems, E-Systems Melpar, and Singer Link, preceded by nine years as a US Naval Officer flying P-3 aircraft. He has led or contributed to the development of 17 major systems, including the Air Combat Maneuvering Instrumentation systems, the Battle Group Passive Horizon Extension System, the National Crime Information Center 2000, and the DDC1200 Digital Zone Control system for heating and air conditioning. Mr. Honour now heads Honourcode, Inc., a consulting firm offering effective methods in the development of system products. Mr. Honour has a BSSE (Systems Engineering) from the US Naval Academy, MSEE from the Naval Postgraduate School, and is a doctoral candidate at the University of South Australia.

