



Engineering of Systems for Navy Interoperability

A 3-Day Course

Planned and Controlled Methods are Essential to Interoperability.

Today's Battle Forces presents difficult challenges to develop. From aircraft to ships to 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 course reviews the latest principles for systems engineering how to apply them to the interoperability of Naval Battle Forces. It includes extensive review and examples of various Navy and DOD interoperability initiatives.

This course is selected by the Secretary of the Navy's Defense Acquisition Career Management Office for acquisition training of Navv personnel.

You should attend this course if you are:

- A leader or a key member of a Navy system development team
- Concerned about the team's technical success
- Interested in how to fit your system into the Battle Force
- Looking for practical methods to use in your team

The challenges today are changing, because systems are changing. Rather than separate, well-defined functions, systems today interact in complex ways to perform operational needs. Many systems are essential to operational success, and seemingly minor design errors can now cost lives.

The challenges today are changing, because acquisition methods are changing. Interoperability of systems is driving new iterative approaches that displace the older "waterfall" acquisition models. New developments require more integrated information quicker.

The discipline and concepts of systems engineering provide ways to manage this complexity. By following the basic systems engineering model, teams organize their thought processes in such a way as to bring order out of chaos. This application is being made today at the levels of system acquisition, platform development, Battle Group deployment, and Navy integration.

Participants in this course practice the interoperability skills by designing and building real interoperating robots that solve a larger problem.

In this course, you will learn the latest systems principles, processes, products, and methods. This is a practical course. You can use the results now in your work. The systems engineering model is a simple flow of concepts, yet is the structure for the entire course and for the work that follows. This model supports the acquisition concepts of interoperability and incremental development.

The course is aimed at **program managers, project managers, technical team leaders, logistic support leaders, and others who participate in defining and developing complex systems.**

Drawing from decades of accumulated knowledge in system development, this course provides you with highly effective tools to use in your work. The material is augmented by examples from real-life experience, including participative examples from the attendees. Lessons covered include:

What is Engineering of Systems? – Basic definitions and concepts for the course. Systems engineering overview; what systems engineering is NOT; full scope of the discipline.

- Objectives, requirements, processes
- Relationship with the organizational hierarchy
- Relationship with Integrated Product and Process Development (IPPD)
- Application in the system life cycle
- Definitions and scope of the discipline
- Systems engineering development models

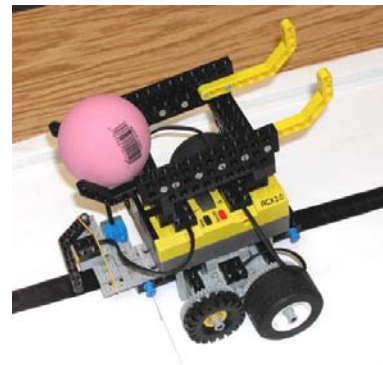
Engineering of Systems for Interoperability – Overview of Navy drivers that require emphasis on interoperability. How the concepts of this course can achieve it while supporting acquisition management needs and requirements.

- Drivers for change – Navy, Department of Defense, and global business.
- New DoD-5000 acquisition impacts – incremental development, functional procurement
- Navy interoperability – overview of how to achieve it using systems engineering
- New visions in the Navy – network centric systems,
- Navy strategies to meet the challenges – maximizing battle space, battle force certification, distributed engineering, design reference missions, integrated warfare architectures
- How engineering of systems supports management needs
- Products with value to the acquisition process

A System Challenge Application – Practical application of the systems engineering model against an interesting and entertaining system development. *Small groups build actual interoperating robots to solve a larger problem.* Small group development of system requirements and design, with presentations for mutual learning.

Systems Engineering Model – The underlying process model that ties together all the concepts and methods. Overview of the systems engineering model; technical aspects of systems engineering; management aspects of systems engineering.

- Model overview
- Incremental, concurrent processes
- Process loops for iteration
- Technical and management aspects of systems engineering



Where Do Requirements Come From? – Requirements as the primary method of measurement and control for systems development. How to translate an undefined need into requirements; how to measure a system; how to create, analyze, manage requirements; writing a specification.

- Stating the need from an operational view, including interoperability impacts
- Quantifying the need

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- Analyzing missions and environments
 - Definition of functional requirements

Where Does a Solution Come From? – Designing a system using the best methods known today. System architecting processes; 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. Getting from the system design to the system.

- Defining alternative concepts
- Analyzing and evaluating alternatives
- Establishing an allocated baseline
- Implementing the baseline system, including integration and production
- Verifying and validating the product system and its processes, including verification of interoperability with other systems
- Transitioning the system into use

Systems Engineering Management – How to successfully manage the system aspects of the component engineering; virtual, collaborative teams; design reviews; technical performance measurement; technical baselines and configuration management.

- Technical teamwork and leadership
- Planning technical processes
- Assessing and controlling the technical processes, with corrective actions
- Analyzing system effectiveness during the development
- Risk management methods
- Small case studies on process management

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

- Interoperability initiatives in the Navy
- Pragmatic principles

The Presenter:

Mr. Honour has been in international leadership of the engineering of systems for nearly a decade, part of a 33-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 continues as Director for Sponsored Research. He was selected in 2000 for Who's Who in Science and Technology. 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 and MSEE from the Naval Postgraduate School.

