Course ID
OUTOFBOX
Course Duration
2 days

Course Title
Thinking Out of the Box: A Systems Engineering Imperative

Related Courses

- Root Cause Analysis of Systems Failure: A Comprehensive Workshop (RCFA, 4-5 days)
- Root Cause Analysis of Component Failure: Understanding Human and Engineering Factors for Improved Product Performance (RCFA-ME, 2-4 days)
- Principles of Software Engineering (SWENG1, 2 days)
- Software Engineering: An Advanced Tutorial (SWENG2, 3 days)
- Software Project Management (SWPM, 2 days)
- Project Management Workshop (PROJMGT2, 2 days)
- Project Management: A Comprehensive Course and Simulation (PROJMGT5, 5 days)
- Succeeding at Technical Management: Do's and Don'ts for the Technical Manager (DOS&DONTS, 1 day)

Aimed At

Working systems engineers who wish to "overcome" the conventional wisdom that gets in the way of building good systems and solving difficult problems.

Group Size

5-25

Prerequisites

While there are no formal prerequisites, this course assumes a couple of years of prior experience in designing and building systems, large or small. It would also be helpful if you have taken our introductory systems engineering course:

- Systems Engineering: An Intermediate Tutorial and Workshop (SYSENG, 2 days)

Course in a Nutshell

In today's often complex world of systems engineering, there is a fair amount of conventional wisdom that needs to be challenged and modified. This is necessary so that we can improve the ways in which we carry out systems engineering and get past the obstacles that result from increased size, complexity, advanced technology as well as constrained budgets and timetables. This course will help you leverage powerful new strategies for thinking and problem-solving.

In this course, you will learn nine techniques for "thinking outside the box". For each technique, we will look at specific examples related to building and managing new systems. We will explore in detail how these ways of thinking can be used to solve difficult problems. We will also look at some other ways of

thinking and examine group processes, both good and not-so-good. Exchange of personal ideas and experiences will be encouraged throughout the course. The course will conclude with a self- assessment that you can use to gauge your own proclivity for out of the box thinking. All in all, the course will help you learn new ways of thinking that you can put to immediate use to improve the engineering and management of today's complex systems.

Customize It!

We can tailor the course to your particular requirements, usually at little to no added cost. The course can also be taught at a higher/lower level or expanded/shortened to match the participant needs and backgrounds.

Course Outline

- Introduction
  - Conventional Wisdom
  - What's Inside and What's Outside
  - Possible Benefits
- Overview of Systems Engineering Elements
  - Customer-defined
  - Developer-defined
  - Complex Systems
- Problems
  - Systems
  - People
  - Software
  - Management
- Overview: Thinking Outside the Box
  - The Inventive Mind
  - Management Thinking
  - Technical Thinking
- Broaden and Generalize
  - Architecting
  - Functional Decomposition
  - Systems of Systems
- Crossover
  - The Concept
  - Software Applications
  - Building/Managing New Systems
- Conventional Wisdom

- Large Complex Government Systems
- Technology
- Business Paradigms
- Challengeable Wisdom

- Back of the Envelope
  - Business Example
  - Compact Models
  - Great Ideas
  - Constructing the Steps
- Expanding the Dimensions
  - Flatland
  - Multifunctionality
  - The Grand Unified Theory
- Obversity
  - 36 Ways to Fail
  - The Top Dozen
- Remove Constraints
  - Typical Constraints
  - Faster, Cheaper, Better
- Thinking with Pictures
  - Visual Thinking
  - Diagramming
- The Systems Approach
  - Seven Elements
  - Alternatives
- Group Processes
  - Signs/Examples of Failure
  - New Solutions
- Other Ways of Thinking
  - Modern
  - The Old Masters
- A “Test”
- Wrap-Up
  - Hurdles to Overcome
  - Course Recap
  - Discussion

How You Will Learn

- A seasoned consulting systems engineer-instructor will present this course in interactive lecture/workshop format.
- Along with the lecture, we will use examples, exercises, and discussions to help you understand and apply the techniques taught in this course.
- A self-assessment will help you gauge your own proclivity toward thinking out of the box.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and apply it on your job.

Revised *Dec 2, 2008f*