Systems Engineering Bootcamp: Taking SE to the Next Level

What Is This?

A dramatically new way of enabling people to understand and effectively apply systems engineering approaches and techniques to real world problems. This workshop is the systems engineering equivalent of an immersion class which teaches a foreign language, and enables participants to not only speak the language, but also to bargain for purchases and negotiate win-win contracts in the new language – all within two days! The hands-on, very interactive approach enables experienced systems engineers to improve their skills in applying both traditional and agile systems engineering approaches and techniques, while providing an unparalleled learning opportunity for less experienced systems engineers.

Fundamental tenet – "When you walk out of the room **you** should be able to start a project - to create a solution for an identified need – on the right road, even if some iteration is needed to satisfy all stakeholders."

Why Consider Participating?

-- **If you are new to systems engineering** (with less than 2 years of experience), this highly interactive event will help you discover the richness and versatility of the systems engineering discipline, and understand how you can apply its integrated practices to make a significant contribution at work.

-- **If you are an experienced system engineer**, this hands-on, highly interactive event will recharge your enthusiasm for systems engineering; improve your ability to lead, coordinate and motivate other engineers and communicate with management and customers; and give you many practical ideas and tips you can apply immediately in your work.

What Have Participants Said?

Inexperienced participants confirm that they are able to immediately apply what they have learned directly to their own project and grow their personal experience base and skills as they practice. Practicing systems engineers report 20% or greater increase in productivity and effectiveness producing a tremendous and nearly immediate return on investment.

-- "Increased the productivity of the systems engineers I sent to this workshop – even the senior ones -- by a good 20%." Engineering Manager

-- "Showed me how to do systems engineering in very pragmatic ways, which allows me to add more value to my project right away." Junior Systems Engineer

-- "I thought this workshop was so important for our systems engineers that I pulled strings to get it taught immediately in my organization." Vice President of Programs

-- "…the boot camp was one of the most impactful trainings I've ever had at ___, and I've had quite a few. To be honest I think most engineers would get more from that one week [of mornings] than they would from many master's programs in SE." Deputy Chief Systems Engineer

-- "We have quite a few junior engineers who are being thrown into projects at different phases of the engineering lifecycle, and many of them simply don't have a solid foundation of Systems Engineering. I think the boot camp is exactly what they need." SEIT Integration Manager

-- "We were in integration when I applied the techniques in the boot camp with my team. We saved the program $600K" Integration Lead

More Detailed Description - A dynamic, non-traditional and highly interactive event in which participants learn the richness and versatility of the SE discipline and its integrated practices.

Through a careful blend of knowledge transfer and a progressive 4-dimensional exercise design, participants are guided through a simulated *real-world* experience. Immersed in solving a real-world problem, participants gain experience executing the foundational technical processes, applying traditional and agile techniques, developing foundational SE products, and understanding the key accomplishments needed to repeatedly conduct a successful solution development project. Participants work hands-on performing an extensive breadth and depth of SE activities, and build a representative set of SE products – a learn-by-doing approach which enables everyone to deepen their understanding while adding to their skill set. The non-traditional format changes constantly from topical presentations and videos to simulated real life SE (systems approach) experiences and exercises, to case studies & war stories from multiple application areas.

Throughout the event participants are taught how to balance competing needs for the maximum good of the project, conducting every activity of the systems approach with consideration of the value it adds and its impact throughout the project lifecycle, ensuring an effective application of a systems approach while instilling the ability to use judgement in the application of the various elements of the practices.

Participants gain proficiency in both the mechanics and the art of the discipline and its practices. Some of the fundamental goals are: the application of SE principles and practices to projects of varying length and type without the need for rewriting organizational processes, to train engineers in the concept of adaptive/agile SE. A variety of special topics are offered ranging from how 'agile' looks in SE and how to handle challenges such as complexity and COTS intensive ("Integration-Focused") SE. At the end of this experience, the participants have a functional understanding of the many facets, application and benefits of SE. While this workshop emphasizes the fundamentals of SE, it is intended to equip practical application and instill the use of judgement in applying the SE practices to fulfill program/customer/business needs.

Participants are encouraged to bring their current engineering challenges into the workshop for practical guidance. People are also encouraged to come with others on their project team, since experience has shown that this offers projects a "multiplier effect" from multiple project members all applying what they have learned to the project.

Themes Threaded throughout the Workshop:

- ➢ Use of judgement in applying the fundamental processes and products to maximize effectiveness and minimize risk
- ➢ Providing impact across the lifecycle - ensuring value of work being done / content being generated
- ➢ Model-Based Systems Engineering
- ➢ Application in varied contexts / industries
- ➢ Push vs. Pull Paradigms
- ➢ Harmonization of the technical baseline
- ➢ Agility of the engineering (e.g. accommodating change, handling unpredictability)
- ➢ Good enough versus non-cost-effective pursuit of "textbook SE"

Key Learning Objectives:

➢ Gain a practical understanding of the core SE technical practices as they can be applied cost-effectively: Stakeholder needs/mission analysis, requirements engineering, architecture design

➢ Develop a working understanding of the use of model based & digital engineering

➢ Understand differences in application of SE practices in Pull (customer-driven) vs. Push (market-driven) paradigms

➢ Techniques for integrating the technical baseline

➢ Integration-focused SE – composible design

➢ Ability to accomplish incremental risk buy-down

➢ Develop a your toolkit of application strategies, approaches, and techniques to apply the foundational processes and products in your context/business/industry

➢ Add some agile systems engineering techniques to your personal toolkit

➢ Ability to communicate with people in all roles; customer and implementers