

*The International Test and Evaluation Association will be hosting...*

## Twelve tutorials throughout the week at the 2009 ITEA Annual Symposium

*Monday September 28 – Thursday October 1, 2009  
Baltimore, Maryland*

ITEA will be presenting seven 4-hour tutorials on Monday, September 28 in addition to two 2-hour classes on Tuesday and three 2-hour classes on Wednesday. One Continuous Learning Point (CLP) will be given for each hour of instruction. The cost of a 4-hour class is \$200, two classes for \$380 and a 2-hour class will cost \$100. You do not need to attend the entire symposium to take advantage of these classes. For more details on the classes and to register on line, visit [www.itea.org](http://www.itea.org).

**Monday, September 28, 2009**  
**8:00 am – 12:00 pm**

### **TUTORIAL I**

#### **Systems Engineering and Test & Evaluation - A Unified Process**

Systems Engineering (SE) and Test and Evaluation (T&E) are often perceived as two processes and two communities. Nothing could be farther from the truth, and the leadership of Defense Acquisition is pushing the infusion of SE into development, acquisition, and T&E. This tutorial will not only help systems engineers, testers, and evaluators to understand one another, but will begin to educate this combined community on how these disciplines must integrate into a unified and rigorous technical process.

### **TUTORIAL II**

#### **Testing 1 – 2 – 3: A Fundamental Course**

This short course is designed to explain the true fundamental concepts and precepts that apply to all testing. The course material will demonstrate that adherence to the precepts is critical to successful T&E and that they apply to all domains of testing, including those belonging to both government and industry, to new system development programs and large construction projects, to well networked systems-of-systems, and even to commercial and consumer products. The course will highlight the importance of T&E to systems engineering, and vice versa. Yet it will also stress that there are differences in competencies and skill sets required in T&E, compared to systems engineering. The primacy of through planning, contingency strategies, validation of test support resources, enterprise level thinking, and understanding customer requirements (both stated and unstated) will all be highlighted, and will be reinforced with lessons learned in the past. Statutory requirements will be discussed, as well as legal liabilities. Guidelines for developing conclusions and recommendations based on test results, and the preparation and publication of test reports will be covered. Ethical behavior expected of the T&E practitioners will also be described. Several simple but effective exercises will be included during the lecture in order to stimulate the participants' thinking and to reinforce the teaching points. Compelling videos of actual testing will be shown for those same purposes. Throughout the course, participant feedback will be captured and addressed in real time.

### **TUTORIAL III**

#### **T&E for Unmanned and Autonomous Systems – An Overarching Perspective**

Unmanned and Autonomous Systems (UAS) are here to stay. DoD is committed to developing numerous systems over the next decade (by 2015, one-third of all ground missions will be unmanned), and intends to rapidly field the systems as they are procured. UAS technologies have progressed from single vehicle automation, to collaborative control of homogeneous vehicles, to heterogeneous collaborative control, which involves a mix of different platforms and varying levels of autonomy. Impressive advances are being made in the R&D community, with a strong desire by everyone to field the systems much more quickly. The warfighter is willing to accept an 80% solution, on the premise that putting unmanned systems in harms way rather than a warfighter will save lives, even if the system is not perfect. However, these systems still must undergo some level of test and evaluation prior to deploying them. With the strong desire for systems from the warfighter, coupled with the rapid pace at which these UASs are developing and evolving, we need to consider options for more flexible T&E of UASs. In today's wartime environment, where we need a rapid turn-around to get systems to the warfighter, adaptability will be crucial. The UAS T&E environment of the future will need to be flexible, responsive, and efficient.

**Monday, September 28, 2009**

**1:00 pm – 5:00 pm**

### **TUTORIAL IV**

#### **Introduction to Concepts for Analyzing System and System of Systems Performance in Complex Environments**

This tutorial will introduce an evaluation strategy and examine a measures framework method that can be used to evaluate joint capability joint mission effectiveness and SoS performance using a Joint Fires mission area use case. A brief description of the Capability Test Methodology (CTM) will be provided. This "how-to" approach will demonstrate the application of a consistent approach to assessing joint capability performance at a complex SoS level in a joint mission environment. Additionally, the use of tailored visualization, modeling, analysis, and simulation techniques will be introduced that enable assessment of capability/system/SoS performance and joint mission effectiveness, refinement of joint capability test designs, and capability assessments pertaining to SoS attributes, joint tasks, and joint mission desired effects. If you desire a robust understanding of how to successfully test and evaluate joint capabilities in a complex joint mission environment this session is for you.

### **TUTORIAL V**

#### **Fundamentals in Leadership**

The tutorial starts with an interactive discussion on the definition of Leadership and Management. A presentation on the differences between Leadership and Management follow. After this short introduction and "grounding session" on Leadership versus Management, five presenters then successively offer their views on the following five areas.

- A) Most Important Keys of Good Leadership
- B) Basis of Good Leadership
- C) Leadership Traits
- D) Leadership Qualities
- E) Leadership Characteristics

The tutorial will end with a presentation on The Process of Great Leadership. Interspersed throughout the presentations, attendees will be offered chances to perform the following self-assessments: Manager/Leader Inventory, Leadership, Leadership Characteristics & Skills, and Leadership Style

## **TUTORIAL VI**

### **Best Practices for Integrating a Reusable Live, Virtual, and Constructive Modeling, Simulation, Data Collection, Analysis, and Instrumentation Environment**

In March 2003, the DUSA (OR) tasked the PM FCS M&S Management Office (MSMO) to ensure compatibility among the respective M&S capabilities of TRADOC, RDECOM, ATEC, and the FCS Lead Systems Integrator (LSI) to support development and acquisition of the FCS Brigade Combat Team (BCT) System-of-Systems (SoS). The engine for this change is the Cross Command Collaboration Effort (3CE). The purpose of 3CE is to develop an M&S and data collaboration environment for design, development, integration, and testing of capabilities, systems, and prototypes. 3CE integrates and provides a common and reusable environment that is documented, controlled, and accessible to Army users. This tutorial provides anyone involved in the acquisition lifecycle of a Program with an overview of fundamental processes and tools to enable a system engineering-based approach for integrating and M&S supported environment. This session will provide a brief overview of 3CE and describe how it is different. It will describe and show practical applications of the 3CE process, demonstrating the current efforts of 3CE and the benefits and return on investment to the Army and Joint/Army users. Lastly, the session will provide an overview of the best practices and capabilities that enable the design, integration, and test of a live, virtual, and constructive environment. At the conclusion of the tutorial, attendees will be equipped with new techniques and ideas for more efficiently employing and integrating an M&S supported environment that will enable successful analysis and evaluation.

## **TUTORIAL VII**

### **Design of Experiments: The Bridge to Systematic Innovation**

Design of Experiments (DOE), which sometimes goes by DOX or MVT (Multivariate Testing), means different things to different people. This tutorial will show that DOE is one of the most powerful testing techniques available, because it provides more information per data point collected than any other method. Because of its information rich content, the data collected via DOE can help practitioners think more critically about their testing process and results. Orthogonal or nearly orthogonal designs will be shown to be the key to evaluating effects independently. Thus, DOE provides the needed linkage to establishing true cause and effect relationships, which is no easy task. Furthermore, DOE provides a very effective means of generating transfer functions. Transfer functions are the gateway to some of the most powerful methods of systematic innovation. Systematic innovation is defined as the application of proven methods and techniques to repeatedly, reliably, and predictably deliver innovative results. Once a transfer function is obtained, a whole new world of innovation opens up via that transfer function. Monte Carlo Simulation techniques can then be used on that transfer function to perform parameter or robust design, tolerance allocation, and sensitivity analysis, all of which contribute to system optimization. The tools and methods of systematic innovation are brought alive by the application of DOE to generate transfer functions. This tutorial will demonstrate the power of systematic innovation made possible only through the application of DOE.

**Tuesday, September 29**

**3:30 pm – 5:30 pm**

## **TUTORIAL VIII**

### **DOD 5000 Update**

On 8 December 2008, the Department of Defense issued a new DoD Instruction 5000.02, Operation of the Defense Acquisition System. This update to the DoD Acquisition System makes fundamental changes to the way the Defense Department develops and acquires new weapon systems. Significant changes include a mandatory Materiel Development Decision for all new start programs, a requirement for competitive prototyping prior to program initiation, and increased emphasis on systems engineering and manufacturing process development. In

addition, on 22 May 2009, President Barrack Obama signed into law the 2009 Weapon System Acquisition Reform Act. The Acquisition Reform Act makes fundamental changes to OSD oversight with increased emphasis on Developmental Test and Evaluation and Systems Engineering, directs increased competition at the prime and subcontract levels, and puts into law many of the new initiatives set forth in DoDI 5000.02. This tutorial provides an overview of these changes and their impact on the DoD Acquisition Management System, DoD Acquisition Workforce, and Defense Industry.

#### **TUTORIAL IX**

##### **Fundamental Statistical Concepts and Methods Needed in a Test-and-Evaluator's Toolkit**

Uncertainty reigns in the world of test and evaluation. Enter statistical methods. Anytime uncertainty or risk is involved, statistical tools play an important role in assessing that risk. This tutorial will address some of the more important statistical methods used in test and evaluation. These include the development of confidence interval estimates for both population means (using continuous data) and population proportions (using binary data); sample size determination for estimating population means and proportions; hypothesis testing and sample size determination for two-sample tests; and the Chi-Square test for the independence of two categorical variables. The participant will be enlightened by understanding the concepts of sample size, confidence intervals, and hypothesis testing and how they all fit together. Extremely easy-to-use statistical software will be used to demonstrate the application of the various methods.

**Wednesday, September 30**

**3:30 pm – 5:30 pm**

~~**TUTORIAL XI**~~ CANCELLED

##### **MIL-STD-810F: Changes and Challenges**

This tutorial will provide discussions on the challenges encountered during the revision process and changes to the former MIL-STD-810F. Over a 2 year period of time the tri service working group fielded numerous comments and engaged private industry participation to ensure the "G" Revision would reflect changes to the military operational environment. Discussion will include lessons learned during the revision process and the basic changes to the test method standard. Emphasis will be placed on the dynamic environments such as vibration, multi-exciter, and time waveform replication.

~~**TUTORIAL XII**~~ CANCELED

##### ~~**Generational Diversity Dynamics for Leaders**~~

#### **TUTORIAL XIII**

##### **Experimental Designs for Complex Test Environments**

Course material emphasizes distributed live-virtual-constructive setups in defense applications, but applies equally well to any test setup that is cumbersome or expensive to control. Introductory experimental design courses normally deal with completely randomized designs, where experimenters can easily and economically change conditions from run to run. But many real-world applications contain some conditions that are difficult or expensive to change. In these situations experimenters may choose to hold some conditions constant for a number of runs, thus reducing the cost of the experiment or making the experiment easier to control, or both. Such restrictions lead what are commonly called split-plot designs. When split-plot designs are combined with fractional factorials, the result is an experimental design that can investigate the effects of a large number of factors in a small number of runs while also accounting for limitations on how the experiment can be conducted. This course includes an overview of factorial and fractional-factorial designs, an explanation of how to construct fractional factorial split-plot designs, some important design considerations based on test objectives, and an example application to a distributed live-virtual-constructive test.